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ABSTRACT

This report describes the results of a survey on toothbrushing behavior and other health-related behaviors in young people. The survey instrument for this study gathered information about students' lifestyle and included a wide range of social, behavioral, and lifestyle variables. The survey encompassed 7,770 schoolchildren aged 14-15, from 131 secondary schools throughout England. The report is divided into four sections: an introduction which discusses survey methodology and the questionnaire; two sections that examine toothbrushing habits and toothbrushing motivation broken down by demographic variation, lifestyles, and dental health behavior; and a conclusion that summarizes the results and offers recommendations to improve toothbrushing. Results revealed a marked gender difference in brushing frequency, with females brushing more frequently than males. In general, better brushing practices were associated with higher self-esteem, Southerners, readers of reputable newspapers, and town dwellers. Students with higher self-esteem and more controlling attitudes seemed to brush for positive aesthetic reasons rather than for disease prevention. Those who brushed their teeth only once a day appeared more motivated by socially instrumental reasons, such as liking fresh breath. Some systematic differences in motivation for toothbrushing were observed, although contradictory tendencies appeared when attempts were made to generalize about particular reasons for toothbrushing. (RJM)

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ED 381 720

Ian Macgregor
John Balding
David Regis

Toothbrushing in adolescence

A study of the toothbrushing habits and motivation of 7770 young people aged 15–16, and their links with social, behavioural and lifestyle variables, based on data generated in the course of UK surveys carried out in 1990 using the Health Related Behaviour Questionnaire.

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Schools Health Education Unit
University of Exeter
1994

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The data on which this publication is based is from the same databank used in the Unit's publication *Young People in 1990*. These annual reports, which began in 1986, summarise the results of schools' use of the Health Related Behaviour Questionnaire. The number of individual records in the Unit's data bank of young people's health-related behaviour now exceeds 300,000.

Ian Macgregor is a Senior Lecturer in the Department of Restorative Dentistry, University of Newcastle

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The authors would like to acknowledge the debt they owe to the pupils that carefully completed the Health Related Behaviour Questionnaire during 1990, and the staff that administered the surveys.

They also wish to record their thanks to the team of data processors, led by Beryl Parkes, within the Schools Health Education Unit. Their attention to detail, and the confidence this engenders in the data, has always been an outstanding feature of the Unit's work.

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Foreword

Ian Macgregor learned of the work of the Schools Health Education Unit in 1985 through reports of the results of surveys in the national press. Interested in the relevance of the lifestyle measurements we were making of the dental health of the young people concerned, he made contact with us and arranged an extended visit to explore the potential of our work in promoting improved dental practice and the training of future dentists.

Since this time he has spent a part of each summer 'holiday' working in the Unit, preparing papers for publication. This monograph includes an overview of these researches, together with additional discoveries and recommendations.

It has been a pleasure to meet him on a regular basis and to have his prompts in the evolution of the survey method.

The UK Health Department's 1988 National Household Survey of adult dental health (Todd & Lader, 1991) demonstrates the marked improvement in the nation's dental health over the past 20 years. In 1968, 37% of adults had lost all their teeth; by 1978 this proportion had dropped to 30%, and to 21% in 1988. People are keeping their teeth longer. They have more positive attitudes towards keeping their teeth, and clean them more frequently than they did 20 years ago.

It is, however, important to appreciate that this improvement will not be maintained without effort on the part of patients, dental health care professionals, the parents of children and young adults, and the schools that teach them. Increased dental charges may discourage regular attendance, and parents are more inclined to let older teenagers take care of their own dental hygiene. The time is right for a practitioner with Ian's experience and understanding of the world of dentistry to investigate the neglected area of young people's 'dental lifestyles' and their motivation for looking after their teeth. The results presented in this monograph will certainly be of interest to schools and dental professionals trying to get their message over more effectively.

When Ian is not acting in his professional capacity as Senior Lecturer in the Department of Restorative Dentistry, University of Newcastle, or researching young people's dental health related behaviour, he is visiting the sites of well-documented paraphysical phenomena, which makes him an entertaining guest and after-dinner speaker as well as a valued professional colleague.

John Balding
Director, Schools Health Education Unit

Summary

This report describes the results of a questionnaire survey of toothbrushing behaviour and other health-related behaviours in young people, conducted in 1990. No clinical examinations were undertaken. The survey instrument, called the Health Related Behaviour Questionnaire, was devised and developed by John Balding, Director of the Schools Health Education Unit at Exeter University. It is used by schools wishing to obtain information about 'lifestyle' profiles of their pupils in order to support health education. The processed data, returned to the respective schools, makes for more effective and more relevant curriculum planning. The Unit's questionnaires and its support services are open to all Health Authorities, primary schools and secondary schools in the United Kingdom.

The Health Related Behaviour Questionnaire includes a wide range of social, behavioural and lifestyle variables. The survey on which this report is based covered 7770 schoolchildren aged 14–15, from 131 secondary schools throughout England, who completed the questionnaire anonymously, in class, during normal school hours. The sexes were equally distributed. Details of the survey method and the sample used are given in Part I.

This report is based on data derived from 7770 young people aged between 14 and 15, in 1990.

We have examined selected variables from the wide range available, in relation to the following:

Toothbrushing habits (Part II): Frequency (how many times a day) and schedule (at what times in the day).

Toothbrushing motivation (Part III): The young people's stated reasons for brushing their teeth.

It examines toothbrushing frequency, schedule, and motivation.

We did not derive information on the quality of the young people's toothbrushing, or the use of dental floss, although later versions of the questionnaire do enquire about the use of dental floss.

Toothbrushing habits

Gender and newspaper readership

There is a marked gender difference in brushing frequency, females brushing much more frequently than males.

Females tend to brush more often than males.

In both sexes brushing frequency is linked to newspaper readership group. (Newspaper readership was used to estimate social group: subjects were asked to report national daily newspapers that were regularly in the home, and were categorised according to readership of broadsheets, tabloids or popular tabloids.) The trend is for young people from homes taking a broadsheet (quality) newspaper to brush their teeth more frequently than those from other homes.

Young people from families of higher social group tend to brush their teeth more frequently.

Once-only brushers

Of those that brush their teeth only once per day, three-quarters do so in the morning before going to school. They prefer brushing after rather than before breakfast. Only 23% of these subjects clean their teeth before going to bed at night. More females than males clean their teeth after breakfast, while more males brush before bed. As newspaper readership changes from broadsheets towards popular tabloids, the proportion of subjects brushing in the morning

Once-a-day brushers tend to brush in the morning.

increases, and of those brushing before going to bed decreases.

At least twice-per-day brushers

Among those that brush two or three times per day, one of these brushes is invariably before going to bed. In those that brush twice per day, the preference for brushing after breakfast persists; few brush during the day. Of those that brush three times per day, two-thirds clean their teeth during the day, while around a third like to clean their teeth both before and after breakfast. The variation with newspaper readership groups is less marked among those that brush twice per day, compared with the once-per-day brushers. Males brushing twice per day and reporting popular tabloids in the home are more likely to brush before rather than after breakfast, compared with males in the other readership groups.

Twice-daily brushers always brush before bedtime, and usually in the morning.

Region, neighbourhood and family factors

Dividing the country between North and South, by drawing a line between the River Severn and the Wash, we found that Northerners brush their teeth less often than those in the South. However, a higher proportion of those living in the North brush their teeth three times per day, compared with those in the South. Brushing three times per day is more common amongst town dwellers than country dwellers. Children born third or later tend to brush less often than those born earlier.

Southerners tend to brush their teeth more frequently than Northerners do.

Bedtime habits and breakfast

Among those that brush only once per day, late-rising males are more likely to brush their teeth at night than in the morning; late-rising females prefer brushing before rather than after breakfast. Of those that brush twice per day, similarly, late-risers and males that go to bed late prefer brushing before rather than after breakfast. In males, broadly, toothbrushing frequency increases with the amount of breakfast eaten; interestingly, those for whom breakfast is just an egg are especially likely to brush their teeth twice. Once-per-day brushers eating breakfast are most likely to time their morning brush after breakfast. (Among these subjects, there is a significant and expected tendency for those late to bed and late to rise to miss breakfast.)

There are links between toothbrushing and sleeping habits, as well as breakfast.

Smoking

Smokers brush their teeth less frequently than non-smokers do. This study found that those that are more heavily engaged in the smoking habit report lower brushing frequencies than those that have never or rarely smoked. Most interestingly, committed smokers — those who do not want to stop — have noticeably lower brushing frequencies than smokers that state they would like to stop.

Non-smokers tend to brush their teeth more frequently than smokers do.

Sporting activity

Toothbrushing frequency increases with increasing participation in vigorous sports played out of school hours.

'Sporty' people tend to brush their teeth more vigorously.

Dental attendance

More recent dental attendance is strongly associated with more frequent toothbrushing. Twice-per-day brushers that visited the dentist more recently show a marginal tendency to brush after rather than before breakfast, compared with those whose dental visit was more distant.

Recent dentist attendance is linked to more frequent toothbrushing.

Recalled dental teatment or advice

Subjects that brush once or less are more likely to report having had fillings at their last dental visit, than those that brush more frequently. Fillings, and to a small extent dental extractions, are associated with readership of the popular press, while readership of the more prestigious newspapers is associated with recalled oral hygiene instruction.

Less toothbrushing corresponds to a greater likelihood of fillings.

Curiously, males that brush their teeth only once per day, before breakfast, tend to have a greater likelihood of having had fillings at their last dental appointment, although this association does not reach statistical significance. Males that brush once per day, after breakfast, are less likely to receive oral hygiene advice, perhaps because they need fewer fillings. In males that brush twice per day, those brushing before breakfast are more likely to have had fillings on their last dental visit than those that brush after breakfast. This suggests that toothbrushing after breakfast might be of greater benefit than toothbrushing before breakfast.

Toothbrushing after rather than before breakfast may be more efficacious.

Motivation for toothbrushing

Respondents were asked to select from a choice of options the main reason they cleaned their teeth:

To make their teeth look nice
To avoid false teeth
Because they like their breath to smell fresh
To avoid toothache
To make their mouth feel clean

Gender and newspaper readership

Males and females brush their teeth for different reasons. Males are motivated more by good appearance and avoidance of bad breath, females more by a need for the mouth to feel clean.

Males and females tend to brush their teeth for different reasons.

Broadsheet newspaper readership is associated with brushing to avoid toothache, and in males a preference for brushing to make the mouth feel clean. Popular tabloid readership is associated with brushing to make the teeth look nice and to avoid false teeth.

Social group can affect motivation for toothbrushing . . .

Region

Northerners favour brushing to make the teeth look nice. Southern schoolchildren brush to avoid toothache more than those in the North do. Males in the South favour brushing to make the mouth feel clean more than their Northern counterparts, though this regional trend is to a small extent reversed in females.

. . . as can geographical location.

Family factors

Children from larger families (four or more children) are more likely to brush their teeth to avoid bad breath and false teeth than children from smaller families are, although these particular motives were the least common reasons given for toothbrushing. Male single children favour brushing to make the teeth look nice, and female single children are more likely to brush to make the mouth feel clean, compared with their counterparts from larger families. First or only children favour brushing to avoid toothache, compared with others; the same is true of children who live with both parents. Children in single-parent families tend to brush to make the mouth feel clean, compared with other children.

Family size can affect motivation for toothbrushing, as can order of birth within the family.

Bedtime and breakfast habits

Early-risers tend to brush to make the mouth feel clean, late-risers tend to brush to make the teeth look nice and to make the breath fresh. Females that go to bed late tend to brush to make the teeth look nice. Males that go without breakfast, or have only a drink, are more likely to brush their teeth to make them look nice compared with males who had breakfast; females show a similar trend.

Motivation is also linked to sleeping and breakfast habits . . .

Smoking

The most committed smokers (who do not want to stop) are the subjects most likely to brush to make their teeth look nice and their breath smell fresh. Non-smokers, especially those that have never smoked, favour brushing to avoid toothache.

. . . and to smoking . . .

Sporting activity

Those that play more sports tend to clean their teeth to make them look nice. Males that play sports frequently seem to be motivated to clean their teeth to make the mouth feel clean; less sporty males brush to avoid toothache. These patterns are absent or reversed in females.

. . . and to 'sportiness'.

Social relationships

Males confident when meeting new members of the opposite sex, and those that have a girlfriend, are more likely than shyer males to clean their teeth for cosmetic reasons (looking nice and making their mouth feel clean). Those that brush only before going to bed brush for more health-promoting reasons (avoiding toothache and false teeth).

Social confidence may be linked positively to cosmetic reasons for toothbrushing.

For those that brush twice per day, as stated above, the most common brushing times are before breakfast and before bed, or after breakfast and before bed. Positive social reasons for toothbrushing are favoured more in those who brush before breakfast rather than after breakfast.

Recalled dental treatment or advice

Those that received only a routine check-up at their last dental visit tend to brush to avoid toothache and to make the mouth feel clean. Having their teeth looking nice is more important to males that had received brushing advice.

Their last dental treatment is linked to young people's stated reasons for toothbrushing.

Conclusion

Clearly, toothbrushing forms part of life's rich pattern, and does not exist in isolation from health and social factors. In general, better practices are associated with higher self-esteem, Southerners, broadsheet newspaper readers, and town dwellers, and it is interesting to speculate what these factors have in common. The placing of toothbrushing during the daily schedule (whether performed once, twice, or more frequently), far from being a 'mindless' habit, appears to be consistent with the most salient reasons for toothbrushing as seen by these young people: for example, the brushing frequency and schedule of those who brush for 'dental' rather than cosmetic reasons tends to be appropriate for that purpose.

Our finding that most once-per-day brushers choose to clean their teeth in the morning, before going to school, suggests that dental health messages should include advice to brush the teeth before going to bed as well.

We observed systematic differences in motivation for toothbrushing, although contradictory tendencies appear when we attempt to generalise about particular reasons for toothbrushing. Those with higher self-esteem and more controlling attitudes, and the more diligent brushers, seem to brush to make the mouth feel clean: that is, for a positive æsthetic reason rather than for the prevention of disease. Northerners, readers of popular tabloids, those from larger families, and the once-per-day brushers, appear to be motivated more by socially instrumental reasons, such as liking fresh breath and their teeth looking nice. Preventative dental health reasons for toothbrushing are also associated with a generally more confident, controlling and long-term view of health.

Dental health advice needs to take account of this broad pattern of background factors, and at a clinical level toothbrushing advice may need to be couched in terms congruent with the individual patient's own motivation for toothbrushing.

Further research could be directed towards investigation of some of these relationships, through, for example, quantitive study using selected personality scales. A quantitative approach using interview techniques would be appropriate to examine the cultural placing of these and other hygiene behaviours.

In conclusion . . .

Toothbrushing behaviour and motivation cannot be considered in isolation from other lifestyle factors.

There are, therefore, implications for health education in schools.

There are also implications for dental clinicians.

There is much scope for further research.

PART I. Introduction

Introduction

Toothbrushing is the principal means consciously used by the population at large for maintaining dental health. It is a simple and effective way of removing plaque, the microbial accretions that collect on the tooth surface. Plaque is the prime cause of periodontal (gum) disease, and plays an essential role in the development of dental caries (tooth decay). There are other mechanisms that are not under the conscious control of the individual — microbes in the mouth are also removed by natural salivation, and fluoridation of public water supplies is known to reduce the incidence of tooth decay.

People that brush their teeth frequently have less plaque and less severe periodontal disease than those that brush less frequently or only occasionally (Sheiham 1970, Addy et al 1987, Todd & Lader 1991). Toothbrushing remains the single most important measure in the prevention of periodontal disease. Studies of the efficacy of toothbrushing in preventing dental caries, however, have produced equivocal results, partly it seems because of the interplay with other factors, such as fluoride exposure and the frequency of dental visits. Probably there is a weak positive association (Sutcliffe 1989). But there is no conjecture about advice to the public: regular and frequent toothbrushing as a means of topical fluoride application is recommended. Fluoride toothpaste came into general use around 1974 and has been shown to have a significant effect in reducing the level of dental caries. Indeed the decline in caries prevalence throughout the Western world in recent years can be attributed, at least in part, to the widespread use of fluoride toothpaste (Naylor & Murray, 1989).

Fluoride has a significant effect in reducing the level of dental caries.

Toothbrushing is the only means of plaque control that should be recommended on a public health basis; other oral hygiene aids, apart from disclosing agents, being a matter for professional advice, according to the Health Education Authority (HEA) in a document first issued in 1985 (Levine, 1989), and since then, although the HEA have issued no new advice, flossing and other inter-dental cleaning agents have been widely adopted. However, increased brushing frequency does not necessarily reflect improved performance and thoroughness. Uninstructed toothbrushing is not very effective (Cumming & Loe 1973), and correlations between toothbrushing frequency and plaque and gingival (gum) inflammation are low (Rugg-Gunn et al. 1979, Addy et al. 1987). Professional instruction is needed for toothbrushing to become effective, and should be the means of teaching toothbrushing skills to people of all ages.

Toothbrushing skills need to be taught professionally.

What public advice then should be given about toothbrushing frequency? There is little data to go on. The HEA policy document (Levine 1989) stipulates only that thorough brushing every day is of more value than more frequent cursory brushing and makes no statement about actual frequency.

Sheiham (1970), in his extensive epidemiological survey of adults and schoolchildren, found the most severe periodontal disease in those people who brushed their teeth less than once per day, and the greatest difference in severity between those brushing less than once and those brushing once per day. On the other hand there was there was little difference in disease severity between those brushing twice a day compared with those brushing three times a day. Similarly, Ainamo & Parviainen (1979), in a study of 365 13-15-year-old children in

BOX 1. Some important recent findings with respect to factors associated with toothbrushing behaviour.

In adults, toothbrushing frequency increases as *socio-economic status* improves (Sheiham 1970, Addy et al. 1990) and the evidence suggests that children from higher social classes are more likely to brush their teeth regularly than children from lower social classes (Beal & Dickson 1974, Macgregor & Balding 1987a).

In adolescents, toothbrushing is responsive to *peer group support*, and to parental dental status (Hodge et al.1982).

Toothbrushing frequency is positively related to bathing frequency and other *hygiene practices*, and appears to be practised as much if not more as a part of grooming as for dental health reasons (Hodge et al. 1982, Macgregor & Balding 1987b).

Toothbrushing frequency decreases as the number of *siblings* increases and as bedtimes get later (Hodge et al.1982, Macgregor & Balding 1987a).

Toothbrushing habits are related to *smoking behaviour* both in adults (Macgregor 1985, Macgregor & Rugg-Gunn 1984, 1986) and in young adolescents (Macgregor & Balding 1987c). These studies indicate that smokers brush their teeth less frequently than non-smokers, and, among adolescents, smokers differ from non-smokers in their motivation for cleaning their teeth. More adolescent smokers brush their teeth to 'avoid bad breath' and to 'make their teeth look nice', compared with their non-smoking peers, presumably to counter the effects of smoking.

In adolescents, toothbrushing is positively correlated with *sporting activity* (Macgregor & Balding 1989) and *self-esteem* (Macgregor & Balding 1991), and to a lesser extent with internal *health locus of control* (Regis et al. 1994).

Motivation for toothbrushing is also associated with *self-esteem.* Young people with high self-esteem are more likely to brush to make their mouth feel clean and to avoid toothache, and less likely to brush to make their breath smell clean or their teeth look nice (Macgregor & Balding 1991, Regis et al.1994).

Finland, found a significant reduction of visible plaque scores with increasing frequency of daily toothbrushing. Statistically significant differences in mean plaque scores were observed between those who brushed less than once and those who brushed once per day, and again between those brushing once and those brushing twice or more per day. A recent study by Hansen et al. (1993), using a random sample of 50-year-olds in Oslo, found severe periodontal disease more frequently in those that brushed their teeth once per day or less than in those that brushed more than once per day. In a 3-year clinical trial in Scotland, involving 3005 schoolchildren of mean age 12.5 years at baseline, Chesters et al. (1992) found that caries prevalence and incremental change were significantly lower in those subjects that brushed their teeth twice per day or more compared with those subjects that brushed once per day or less. It is not really known how frequently people should brush their teeth, but the available evidence suggests that brushing twice daily is sufficient, while there is little benefit in brushing more (Sheiham 1977).

The available evidence suggests that there is little point in brushing more often than twice per day.

For the purpose of this study, we have considered brushing twice daily, once in the morning and once at night, as an 'adequate' frequency, whilst brushing once per day (or less) we have considered inadequate.

Background to the present study

Little is known about people's toothbrushing habits and the factors that are associated with toothbrushing behaviour. Box 1 summarises some important recent findings.

Within this study we have included the results of a comprehensive questionnaire survey of toothbrushing behaviour and other health related behaviours in schoolchildren throughout England aged 14–15, conducted during 1990. These health related behaviours cover a wide range of social, behavioural and lifestyle variables, including the following:

AIDS
Alcohol consumption
Bedtime/time up
Dental care
Diet
Drugs
Health care
Hygiene practices
Leisure pursuits
Medication
Personal relationships
Physical recreation
Reading & newspapers
Self-concept
Smoking
Social activities
Spending and earning
Worries

A completed page from Version 12 of the Health Related Behaviour Questionnaire (see page 9). *The questionnaire is reproduced in the Appendix.*

General Questionnaire (Version 12) *HEA Schools Health Education Unit*

34. When did you last visit the dentist in his or her surgery?

Within the past 7 days	1
Within the past month	2
Within the past 3 months	(3)
Within the past 6 months	4
Within the past year	5
More than a year ago	6

Circle ONE number only

35. What treatment or advice did the dentist give you on this last visit?

	Yes	No
Fillings	1	(0)
Extraction (having teeth out)	1	(0)
Scaling and polishing	1	(0)
Brace fitted or examined	1	(0) *
Routine check-up	(1)	0
Advice on brushing	(1)	0
Advice on 'flossing'	1	(0)
Other treatment	1	(0)

Please circle an answer on each line

36. What is your main reason for cleaning your teeth?

You like your teeth to look nice	1
To avoid wearing false teeth	2
You like your breath to smell clean	3
To avoid toothache and dental treatment	(4)
You like your teeth and mouth to feel clean	5

Circle ONE number only

37. What sort of lunch did you have yesterday?

In school — cafeteria	1
In school — set lunch	2
In school — your own packed lunch	(3)
Outside school — e.g., fish & chips, burger from shop	4
Outside school — your own packed lunch from home	5
At home	6
Did not have any lunch	7

Circle ONE number only

38. What sort of breakfast did you have this morning?

Nothing at all	0
Just something to drink	1
Tinned or fresh fruit (+ drink)	2
Cereal (+ drink)	(3)
Just an egg (+ drink)	4
Cooked breakfast with cereal, etc	5
Toast or bread	6
Toast and cereals	7
Something else	8

Circle ONE number only

39. Have you ever tried to lose weight?

Yes	(1)
No	0

Circle ONE number only

40. Have you ever tried to avoid putting on weight?

Yes	(1)
No	0

Circle ONE number only

Page 8 *© John Balding 1989*

Purpose of the study

In the study presented here we include details of connections we have discovered between toothbrushing *frequency*, the times of day young people prefer to brush their teeth (toothbrushing *schedule*), and their *motivation* for toothbrushing, with selected other variables as follows:

Demographic	Age Gender & newspaper readership Region Neighbourhood Family composition
Lifestyle	Getting up & time to bed Breakfast Smoking Sporting activity Social relationships
Other dental health behaviours	Dental attendance Recalled dental treatment/advice

Other analyses were also made, and these tables are to be found below, where relevant.

The aim was to examine these connections for a greater understanding of the social background to toothbrushing behaviours in young people. We were particularly interested to examine behavioural inter-relationships in the hope of identifying appropriate dental health messages.

Method

The sample

The present study covers children aged 14–15 from 131 secondary schools distributed throughout England. The sample was obtained in 1990 from schools which elected to use the Health Related Behaviour Questionnaire (Balding 1984a) published by the Schools Health Education Unit (SHEU), School of Education, University of Exeter. Completed questionnaires are returned to the SHEU, which undertakes the data analysis and returns the data, suitably tabulated, to the respective schools. Use of the questionnaire is open to all secondary schools in the United Kingdom.

The Health Related Behaviour Questionnaire is used by schools throughout the UK.

Obtaining an unbiased random sample of individuals, particularly in children, is an elaborate and expensive process. The present sampling method was through District Health Authorities (DHAs) and Local Education Authorities (LEAs) but was self-selecting to the extent that schools themselves chose whether or not to participate in the locally-sponsored survey. Thus the sample of schools and communities is geographically uneven. The survey population arises from the response to DHAs that promoted the questionnaire in their schools during 1990.

Naturally this tends to result in clustering of sites, but as use of the questionnaire becomes more widespread the clusters become more numerous and embrace a wider sample of the population.

The practice page used in Version 12 of the Health Related Behaviour Questionnaire.

General Questionnaire (Version 12) *HEA Schools Health Education Unit*

PRACTICE PAGE

In this questionnaire there are different types of questions. These are the commonest:

TYPE 1 These ask you to *write information in your own words*...

About what time did you wake up this morning?
(Please write the time) .....

TYPE 2 These ask you to indicate your answer by *drawing a circle around one number only*...

How often have you ridden a bicycle during the past 2 weeks?

Not at all	1
Once or twice	2
Most days	3
Every day	4

TYPE 3 For these questions you are asked to answer by *circling one number on each line*...

When did you clean your teeth yesterday?

	Yes	*No*
Before breakfast	1	0
Just after breakfast	1	0
During the day	1	0
Before going to bed	1	0

TYPE 4 These ask you to *circle the answer itself*...

Do you think that your parents usually like to hear about your ideas?	Yes	No	Don't know

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Sample size and its selection

In order to establish the minimum sample size for any given year group, data from random samples of different sizes drawn from one large school were examined. This school had year groups numbering around 450 individuals, with the sexes evenly distributed. Comparison of the results from the different samples established that a sample including 50 individuals of each sex provided a reliable reflection of the parent population for most of the questions in the questionnaire; for some questions a smaller sample proved adequate. This represents a sample size of 22%. As most of the SHEU surveys have been carried out in year groups smaller than 450 (typically around 200) a sample size of 100 usually represents a greater proportion of the year group than the 22% found adequate in the pilot investigation.

No accommodation was made for variation in socio-economic status in obtaining year group samples, although links between social status and health of individuals (Whitehead 1987), and academic success in school (Lawton 1968), are well established.

Links between social status, health, and academic success are well established.

Obtaining the sample

Participating schools were provided with a standard 'Supervisor's guide' containing detailed instructions about administering the questionnaire (Balding 1994). These instructions were that the classes sampled should reflect the academic profile of the year group: that is, it would be best to sample mixed-ability classes in non-streamed class time. The target sample size should be 100 subjects in each year group, mixed schools having the sexes equally distributed in the year group sample. All the pupils in the class should answer the questionnaire.

The questionnaire

Background to the questionnaire

The object of the Health Related Behaviour Questionnaire used in this study was originally to assist secondary schools in planning their curricula (Balding 1994). It is not primarily a research exercise. It was first introduced in 1976; since then successive versions have been developed in consultation with teachers, health-care professionals and others concerned with health education and the welfare of young people. To date, upper middle and secondary schools have used it in conjunction with their own curriculum development in more than 1500 separate surveys, generating data for over 300,000 pupils between the ages of 11 and 16 years. The version used in this study was Version 12 (Balding 1989: see Appendix).

The surveys are currently commissioned to support objective health-care planning by DHAs and, through sequential use, to monitor changes or trends in the local populations.

Use of the Health Related Behaviour Questionnaire promotes objective health-care planning by District Health Authorities.

BOX 2. For non-statisticians: statistical testing.

All statistical tests assign a likelihood to a particular finding. Any given pattern of findings could be produced by chance alone, so statistical tests are used to discover how likely it is that a given pattern of findings has been produced by chance.

Suppose a teacher tosses a double-headed 1p coin repeatedly and records, with a class, which face comes up. The first time it comes up heads (H).

The next throw also produces a head, recorded as HH.

Repeated tossing yields the pattern:

HHH

HHHH

HHHHH . . .

When does the penny drop? In doing this sort of exercise with an unsuspecting class there is a certain amount of fidgeting when three heads have appeared in a row, which turns to comment at four and mirth at five. How unlikely is getting five heads (or tails) in a row, assuming an ordinary (unbiased) coin is used?

The chances of getting two heads in a row is 1 in 4. Assuming two tails would be as interesting, the chances of getting two heads or two tails in a row is 1 in 2 trials. For three heads or tails in a row the odds are 1 in 4; for 4H/4T the odds drop to 1 in 8 — so for 5H/5T the odds are 1 in 16. So the chances of getting five heads or five tails in a row with an unbiased coin are 1 in 16. (Another way of putting this is to say that if 16 pupils performed this exercise, we should expect one of them to get a run of five heads or tails.)

In statistical tests we set a threshold of likelihood, in this case 1 in 20 (as a decimal, 0.05), below which we conclude that the coin is probably not unbiased. This is expressed as alpha (α) = 0.05. We would declare a coin suspect only after a run of six consecutive heads or tails, for this is less likely than 1 in 20 (in fact, it is 1 in 32).

This is for a simple situation involving one variable (the coin face) with two equally likely conditions (heads or tails). In this case it is easy to work out the odds. However, for the tables below we have more than one variable (e.g. toothbrushing frequency and gender) which may have more than two conditions (five for toothbrushing frequency: no times, once, twice, thrice, four times) and these conditions are not equally likely. In this case working out odds is far too time-consuming, even with computers.

Fortunately there is an alternative in a statistical test which calculates a figure which summarises how 'biased' a table is. (The test is known as the Chi-squared [χ^2] test, the Greek letter chi [χ] being designated to stand for the figure in question.)

Continued overleaf

Format of the questionnaire

Version 12 of the questionnaire contains 78 questions (some subdivided into several parts) laid out in an 18-page book. The questionnaire opens with a practice page in which the respondent has the opportunity to answer four different types of question which feature in the main questionnaire. This practice page is reproduced on p. 8.

Respondents sometimes fail to circle the code number for a negative answer, and this exercise stresses the importance of indicating negative replies.

As far as possible, the method of answering is given against each question.

Administration of the questionnaire

It was emphasised to the supervisors that the questionnaire should not be administered on a Monday or on any day following a holiday since some questions refer to 'yesterday', which should be a weekday. For similar reasons, the exercise should not be undertaken during a week following holidays of more than 7 days.

In the data, 'yesterday' is always a weekday.

Pupils completed the questionnaire in class, during normal school hours, working at their own pace. No prior warning was given. Anonymity of the respondents was preserved by instructing them not to write their name on any part of the script. The confidentiality of the exercise was emphasised to the schools; teaching staff were placed under an obligation not to look at the scripts and to inform the respondents that the scripts would be sealed immediately after completion, processed away from the schools and destroyed after processing. Before answering questions on the questionnaire itself, respondents were taught the method of completion through use of the practice page (see p. 8).

Data analysis and statistical tests

The completed scripts were coded and analysed using the SPSS-X computer software package. Chi-square [χ^2] tests on original data were used for the statistical analyses ($\alpha = 0.05$). If these terms are unfamiliar, please see Box 2 opposite and overleaf.

Only questions that were answered were included in the analyses.

Estimation of social group

Social group is important in any investigation of human behaviour, but its precise definition is difficult because of the high degree of present-day social mobility, and it is likely to vary with the definition used.

In this study, national newspapers reported in the home were used to estimate social group. Classifying children by the occupation of the head of the household, the criterion by which social class is defined, was not used because asking children for information about a father's occupation was considered inappropriate. Nowadays children are frequently brought up by unemployed parents, adoptive or step-parents, a single parent, or retired grandparents, and in any case may not know, or may be unable to describe adequately, their parents' job.

Asking children questions about their father's job is not always useful.

Subjects were instead asked to circle national daily newspapers that were regularly in their home.

BOX 2. For non-statisticians: statistical testing (continued).

For example, we might suppose that hair colour and handedness go together. In a school of 1000 pupils, we find 10% of pupils with red hair, with 70% brown-haired and 20% fair, and we find 20% who are left-handed and 10% ambidextrous.

	Brown	Fair	Red	All
Right-handed				700 (70%)
Ambidextrous				100 (10%)
Left-handed			?	200 (20%)
All	700 (70%)	200 (20%)	100 (10%)	1000 (100%)

We would expect 10% of the left-handers to be red-headed if there was no bias (i.e. association of handedness with hair colour), which works out at 10% of 200 = 20.

We may find that we actually get ten, or as many as 40, of the 200 in that cell on the table. χ^2 is an expression of all such differences seen on a table. Association or 'bias' would result in more and larger differences from our expectations. By comparing actual 'observed' figures with the expected values and doing some sums according to a given formula, we can determine the value for χ^2 and work out how unlikely it is to get as large a figure as that value of χ^2.

The larger the value of χ^2 , the more unlikely it is that the distribution of cases seen on the table is unbiased — that is, the differences seen are more likely to be due to a real association between the two variables than to have arisen by chance from unassociated variables. We then say that the difference or the association observed is probably not due to chance and is 'statistically significant', and we conclude that the two variables are probably associated in some way — in this case, that the occurrence of different handedness is different for different hair colours.

'Probably not due to chance', in this case, means that it is as unlikely as getting six heads or six tails in a row from an unbiassed coin.

Three newspaper readership groups have been used in this study:

Group I (broadsheet) *Guardian, Independent, Telegraph, Times*
Group II (tabloid) *Daily Express, Mail, Today*
Group III (popular tabloid) *Mirror, Star, Sun*

Where newspapers from more than one newspaper readership category were reported (e.g. III and I), the upper newspaper readership group (I) was assigned.

Newspaper readership differs across social classes.

The validity of this method is supported by a sociological study of newspaper readership by Tunstall (1980). According to Tunstall the social class polarisation between the popular tabloids and prestige broadsheets reflects real differences in education and reader interest. He showed that readership of the broadsheets (at that time, the *Guardian*, the *Daily Telegraph* and the *Times*) is heavily weighted towards social group A (of whom 42% read the *Telegraph*, 20% the *Times*, and 17% the *Guardian*) and diminishes rapidly as social status declines. Conversely, about 40% of social groups C2 (Skilled Working) and D (Working) read the *Daily Mirror* or the *Sun*, and these proportions decline markedly as social status improves.

However, readership of the *Daily Express* and *Daily Mail* is spread across the social class spectrum; the proportions of readers in classes A, B and C1 (Lower Middle) are similar, although readership of both newspapers is marginally higher for C1 than for any other group. So, while the newspaper readership groups I & III appear to discriminate well at the upper and lower ends of the scale, the broad readership of the *Daily Express* and *Mail* means that Group II is a poor discriminator of social class.

Quality of the data

The reliability of self-reports is often questioned. Self-reporting is liable to error on account of memory failure, self-deception, wishful thinking, or the imagined or desired reaction of the questioner. Thus there might be a desire to please by giving an answer the questioner would approve of, or to annoy by giving an answer intended to disturb the questioner. This problem is addressed in the supervisor's instructions, which point out that valid responses are more likely where the atmosphere in which the questions are answered is conducive to making the pupils feel the answers they give are important to themselves, and may be of personal benefit.

Collecting the data

The manner in which data is collected in a survey of this kind is vitally important. Irrespective of the sampling technique, the value of such data is questionable if the respondent does not enter properly into the spirit of the enquiry. Large numbers of unanswered questions or abused questionnaires signal a doubtful procedure.

The manner in which data is collected is vitally important.

An important virtue of the Health Related Behaviour Questionnaire is that it

BOX 3. Refining the method: the psychology of question and answer.

A curious effect of memory was observed as a result of interviewing respondents. With respect to the question *When did you start smoking?*, in a former questionnaire (not in Version 12) it was found that, irrespective of age, smokers consistently replied that they started smoking two years previously. Although, for the longer-standing smokers, the length of time since they started smoking may have 'felt' about two years, it was most probably longer.

Questions that ask the respondent to specify a time interval, for example *When did you last visit the dentist in his or her surgery?*, with possible answers covering a timescale from the present to more than a year previously, may also produce bias (Balding 1992a). All questions of this type involve a degree of uncertainty, which increases with the time interval. A respondent may be unsure which of two intervals should be selected, and therefore other factors may influence the chosen answer.

Evidence that respondents search for the right response from the top of the list downwards and mark the first one that seems near to their memory has been found from our data. In Version 8 of the questionnaire, six possible answers to the question *When did you last visit your doctor?*, ranging from 'within the last week' to 'more than a year ago', were listed in decreasing timescale down the page. In Version 10 (the following version) and subsequent versions, the order of the timescale was reversed. In respondents aged between 11 and 14 years, variations between the two versions were observed, for example, in the proportions of subjects who reported visiting their doctor within the last six months. Higher proportions of subjects reported visiting 'within the last six months' in Version 10, where this answer was third in the list, compared with the earlier version where it was listed fourth.

Similar effects have been observed with other reversed timescale questions. This 'reverse effect' needs to be taken into account when interpreting data from questions involving more distant memory, and those using timescales as prompts.

TABLE 1. Comparison of aggregate percentage distributions of toothbrushing schedule in English and Welsh schoolchildren aged 15 years, from the OPCS survey of parents, 1983 (Todd & Dodd, 1985). Data for English schoolchildren aged 14–15 years is added from the present study (SHEU, 1990).

	% of subjects	
Toothbrushing schedule	*Present study 1990*	*OPCS 1983*
Before breakfast	33.3	25
After breakfast	65.4	65
During the day	10.3	5
Midday/other times	–	5
After evening meal	–	13
Before bed	82.3	75

is administered by the school itself for its own purposes as well as to support the important work of the District Health Authority. If a school chooses to purchase the service, and administer the questionnaire within its already crowded timetable, then it is serious about the enquiry, and this commitment will be transmitted to the respondents.

Moreover, the survey is financially costly, so that high levels of commitment to following the prescribed method of data collection are commonly present. Feedback to the users of the survey method, and in many instances to the respondents themselves, further serves to promote the quality of the data and reduce the potential for bias.

Validity of the responses

Internal reliability, that is, consistency between answers given by the same person, was assessed by examining data from individual scripts covering different questions relating to specific respective behaviours. For example, data on alcohol consumption and cigarette smoking were consistent with expenditures on these respective items.

A further aspect is external reliability, that is, whether another person will answer the same question in the same way. We know that many of the questions show striking consistency between pupils at different schools. This raises the issue of validity — that is, whether the answers to the questions actually mean what we understand them to mean. This problem has been addressed by interviewing respondents following completion of their scripts under the conditions described above. Private and confidential interviews have customarily been undertaken by small teams of young teachers, to maintain a reasonably small age gap, appropriately trained, who are introduced to the class at the end of the time allotted for answering the questionnaire. The interviewer seeks permission to examine the questionnaire with the respondent and to make notes if necessary. In this way the degree of misinterpretation, problems with memory, and unreliability on account of respondents wishing to place themselves in too favourable a light or to shock the reader, can be assessed.

Validation is an essential component of the questionnaire survey method.

The above process has played an important role in shaping and improving the quality of the questions in the successive versions of the questionnaire. In the course of this work some psychological effects of questionnaire layout have also been uncovered (see Box 3).

Comparisons with other surveys

Comparison of our findings with those of other surveys of behaviour in young people, such as newspaper readership (Tunstall 1980) and smoking prevalence (Dobbs & Marsh 1983, Nelson et al. 1985, Lader & Matheson 1991) provide further support for confidence in our data.

The 1983 national survey of children's dental health carried out by the Office of Population Censuses and Surveys (OPCS) (Todd & Dodd 1985), which employed random sampling methods, also shows close comparisons with our results (see Table 1). An important difference here is that the OPCS asked the parents in a postal survey how often and when their children brush their teeth (i.e. as a rule), whereas the Health Related Behaviour Questionnaire asks the young people themselves to report on the previous day's actual performance.

Toothbrushing per day	SHEU 1984 Children aged 14-15 years			SHEU 1990 Children aged 14-15 years			OPCS 1983 Children aged 15 years
	Male	*Female*	*ALL*	*Male*	*Female*	*ALL*	*ALL*
Nil	10.1	1.7	6.4	2.0	0.5	1.3	5
Once	40.1	23.0	32.6	25.5	13.1	19.4	21
Twice	43.6	58.8	50.3	65.0	69.4	67.2	61
Three or more times	6.3	16.4	10.8	7.5	17.0	12.2	12
Base	100	100	100	100	100	100	100
Sample (SHEU)	4575	3615	8190	3758	3652	7410	–

TABLE 2. Comparison of frequency data from the OPCS survey of parents, 1983 (Todd & Dodd, 1985), with Schools Health Education Unit pupil data.

Do parents really know how often their children brush their teeth?

Both methods may be subject to reporting bias for reasons of social desirability, although in the OPCS method there is an additional problem that unless the parents themselves brush their children's teeth there may be a mismatch between children's perceived and actual behaviour.

With respect to toothbrushing frequency, we have reported previously that the 1983 OPCS findings are consistent with the results obtained in our surveys (Macgregor and Balding 1987a), and these data are also given in Table 2. Furthermore, Bedi et al. (1990) found that differences reported in our data in the type of dental care received on the last visit to a dentist similarly concur with the OPCS survey (not shown). The 1983 OPCS survey of children's dental health also asked parents at what times of day their children brushed their teeth (Todd & Dodd 1985, p. 66). Table 2 shows the percentage distribution of toothbrushing frequency and schedule for the sexes combined, compared with the findings of the OPCS survey. As the table shows, our findings approximate to those of the prior study — the mismatch between figures may be due to sampling differences, or to the data collection method used (see above). SHEU data shows an increase in brushing frequency from 1984 to 1990 (Balding 1992a).

Both surveys found that the most popular times for cleaning teeth were before going to school in the morning and before going to bed at night. This distribution is examined in more detail in the next section.

Autres jours, autres mœurs?

The questionnaire enquiry method seeks information about young people's toothbrushing behaviour *on the previous day*. This is an attempt to overcome bias or 'wishful thinking', which can affect answers to questions about what they *usually* do. It is well known, for example, that people's actual drinking habits may be at variance with their perceptions of themselves as drinkers, and that asking them specifically what they drank on the previous day is likely to produce more accurate data than a more general question about their consumption of alcohol.

This does raise the possibility that 'yesterday' was not typical for an unknown proportion of the young people, but in universalising the data for this report the assumption has to be made that it was. For example, it is assumed that young people that usually brush their teeth only once a day, did so on the day before the survey; conversely, that those that brushed their teeth only once on the previous day are habitual once-a-day brushers. This is, in fact, even more likely to be true for a very personal and routine behaviour, such as toothbrushing, than more social pursuits such as drinking. For the reason explained in the previous paragraph, we believe that the error produced by exceptional reported behaviour still leaves the data more representative than inviting respondents to generalise, or to attempt to remember their behaviour over a specific but much longer period of time.

PART II. Toothbrushing Habits

FIG. 1. The regional distribution of the 7770 schoolchildren in the sample.

Because of insufficient information, 6.4% of the young people in the sample could not be assigned to any region.

Introduction

In this section we examine toothbrushing *frequency* (the number of times per day the teeth are cleaned), and toothbrushing *schedule* (the times of day when the teeth are cleaned), and their respective relationships with *demographic, lifestyle* and *dental health behaviour* variables.

The sample

As already stated, 7770 scripts were completed in 1990 by pupils aged 14-15 from 131 schools, and subsequently coded and analysed in Exeter. The schools were widely distributed throughout England. Fig. 1 shows the numerical distribution of schools in the different regions of the country. The gender distribution of the respondents was: males 50.8%, females 49.2%.

Toothbrushing frequency

Information about toothbrushing frequency and toothbrushing schedule was obtained by asking subjects *When did you clean your teeth yesterday?* Possible answers were: *before breakfast, after breakfast, during the day, before going to bed.*

The percentage distribution of responses for males and females combined, indicating toothbrushing frequency per day, was:

Nil	1.3%
Once	19.3%
Twice	67.2%
Three or more times	12.2%

There was a marked difference in brushing frequency between the sexes (Table 2), females brushing significantly more frequently than males (χ^2 = 320.3, df = 4; p <0.0001). This gender difference is consistent with all other comparable studies of toothbrushing frequency in both sexes. SHEU data also shows comparable gender differences with other related grooming behaviours, such as bathing and hair washing (Balding 1992b). Because of this observed difference we have considered it appropriate to examine data for the sexes separately, virtually throughout.

Females brush their teeth significantly more frequently than males do.

Newspaper readership groups

The percentage distribution of newspaper readership groups was as follows:

	SHEU 1990	*Tunstall 1980*
Group I (broadsheet)	28.2%	15%
Group II (tabloid)	30.9%	30%
Group III (popular tabloid)	40.9%	61%

The second column total came to 106% because Tunstall recorded all newspapers read. In our earlier surveys, made in 1984–85 (e.g. Macgregor & Balding 1987b), we found much closer agreement with Tunstall's figures. In the present study, compared with Tunstall's results, the proportions of subjects in the Group I has increased, and has declined in Group III. This shift may, in part, be explained by the advent of the newer newspapers, the *Independent* and

TABLE 3. Percentage distribution of toothbrushing frequency in schoolchildren aged 14–15, by newspaper readership group.

Toothbrushing frequency per day	MALES Readership group* I	II	III	FEMALES Readership group* I	II	III
Nil or once	22.0	26.1	30.4	11.3	13.6	15.6
Twice	68.9	68.1	61.3	72.0	68.1	67.1
Three or more times	9.2	5.8	8.3	16.7	18.3	17.4
	100	100	100	100	100	100
Base	896	994	1316	905	984	1302

* Derived from newspapers reported to be in the household as follows: Group I *Guardian, Independent, Telegraph, Times*; Group II *Daily Express, Mail, Today*; Group III *Mirror, Star, Sun*

χ^2 on original data comparing sexes = 356.2; df = 2; p <0.0001

TABLE 4. National newspapers taken regularly in the homes of schoolchildren aged 14–15, by toothbrushing frequency.

Newspaper in home	MALES Brushing frequency *Once or less*	*Twice or more*	FEMALES Brushing frequency *Once or less*	*Twice or more*
UK distribution				
Daily Express	8.4	12.0	8.9	11.0
Daily Mail	13.0	16.5	16.4	18.5
Daily Telegraph	4.5	8.2	4.6	6.7
Daily Star	10.0	8.9	9.2	10.6
Today	4.8	6.4	5.3	7.1
The Guardian	5.7	8.0	6.6	8.9
Daily Mirror	23.1	25.7	24.9	27.6
The Times	8.5	12.4	9.7	13.6
The Sun	39.5	35.8	38.9	37.2
The Independent	4.2	6.3	4.3	6.7
Scottish distribution				
The Scotsman	3.1	4.3	2.7	4.2
Daily Record	25.6	20.7	24.5	22.1
Daily Express	4.9	5.9	5.5	6.2
Glasgow Herald	5.1	6.4	4.2	7.0
No newspaper, or missing data	18.3	15.5	19.5	14.2

Today, which now command substantial readerships.

Toothbrushing frequency also varied with newspaper readership group. As has been found in prior studies (e.g. Sheiham 1970), and as we have previously reported (Macgregor & Balding 1987a), brushing frequency increased with improving socio-economic status, in both sexes (Table 3).

Since 1990, the SHEU has stored data not just on newspaper readership group but on which newspapers are taken in the home. It appears that nearly all newspapers are more likely to be taken in homes where the young people in the family brush their teeth at least twice a day (Table 4). Only the *Sun*, *Star*, and *Daily Record* (Scotland) are exceptions to this. The *No newspaper or missing data* group is believed to represent mainly households that take a local newspaper rather than a national one: this assumption is based on work using an earlier version of the questionnaire, in which a free-response question allowed data on local newspapers to be collected.

TABLE 5. Aggregate percentage distribution of toothbrushing schedule in schoolchildren aged 14–15, by toothbrushing frequency.

Toothbrushing schedule	MALES Brushing frequency per day			FEMALES Brushing frequency per day		
	Once	*Twice*	*Three times*	*Once*	*Twice*	*Three times*
Before breakfast	27.9	34.0	56.1	27.5	28.7	51.4
After breakfast	44.7	66.1	80.6	51.8	71.5	81.5
During the day	2.1	2.0	63.6	1.7	2.4	67.1
Before bed	25.3	98.0	99.6	19.1	97.4	100.0
Base	957	2441	253	477	2536	572

χ^2 = 9.6 on original data between males and females that brushed once per day; $p < 0.05$

TABLE 6. Percentage distribution of toothbrushing schedule in schoolchildren aged 14–15 that brushed their teeth twice per day.

Toothbrushing schedule	*Males*	*Females*
Before breakfast and during day	0.7	0.7
After breakfast and during day	0.9	1.4
Before breakfast and before bed	32.9	27.5
After breakfast and before bed	64.8	69.6
	100	100
Base	2441	2536

χ^2 on original data = 19.19; $p < 0.01$

TABLE 7. Percentage distribution of toothbrushing schedule in relation to breakfast in schoolchildren aged 14–15 that brushed their teeth three times per day.

Toothbrushing schedule in relation to breakfast	*Males*	*Females*
Before breakfast and 2 other times	19.4	18.5
After breakfast and 2 other times	43.9	48.4
Before and after breakfast and 1 other time	36.8	32.9
	100	100
Base	253	572

χ^2 on original data = 1.0: not.significant

Demographic variation

Variation with gender

Table 5 shows the variation in toothbrushing schedule for those subjects that brush their teeth once, twice, and three times per day. We have excluded those that gave no response and those that brushed 4 times per day.

In both sexes, for those that brush once, the preferred time is after breakfast. In males, the next preference is about equally distributed between brushing before breakfast and bedtime. In females there is a distinct second preference for brushing before breakfast rather than at night. Few of those that brush only once do so during the day. The 1983 OPCS survey also found that the proportion of children that brushed during the day was low (Todd & Dodd 1985, p. 66).

Those that brush twice or three times per day invariably do so before bed, but among those that brush twice there is no greater preference for brushing during the day than in those that brush only once. In those that brush twice, the preference for brushing after breakfast persists, again more so in females. Among those that brush three times per day, as expected, the proportion that brush during the day shows a marked increase.

Looking at those that brush only once per day (from Table 5), the pattern of toothbrushing schedule varies significantly between the sexes. The proportion of males and females that brush before breakfast is the same, but a greater proportion of females than males prefer to clean their teeth after breakfast rather than at bedtime. A possible explanation is that females brush to make the mouth feel clean after eating breakfast, and this is consistent with the finding that females report this as their main reason for cleaning their teeth (Macgregor & Balding 1987b). This indicates that advice to brush the teeth before going to bed as well as in the morning would be a cardinal dental health message. We examine the relation between eating breakfast and toothbrushing in the morning in more detail later in this report.

Toothbrushing patterns are different for males and females.

Brushing the teeth before going to bed as well as in the morning is a cardinal dental health message.

For those that brush their teeth twice per day, the combinations of brushing activity, except the very rare, are shown in Table 6. Brushing after breakfast and before bed is the most common combination, found in around two-thirds of respondents. Most of the remainder brush before breakfast and before going to bed, so that, as we have already seen in Table 5, those that brush twice per day tend to do so at the beginning and end of each day, which is a satisfactory regime. The proportion of subjects that brush only before and after breakfast is very low.

Although we categorised brushing three times per day as adequate, it is of interest to examine toothbrushing activity in relation to breakfast time in those that brush their teeth this frequently (Table 7).

This table shows that almost a third of these individuals brush their teeth both before and after breakfast, the sexes being similar in this respect. As we have found previously, there is little difference in toothbrushing behaviour between males and females that brush their teeth three or more times per day (Macgregor & Balding 1987b).

However, not all children that brush their teeth in the morning have breakfast before going to school. Our studies (Balding 1993) indicate that 15% of pupils

TABLE 8. Percentage distribution of toothbrushing schedule by newspaper readership group in schoolchildren aged 14–15 that brushed their teeth once per day.

Toothbrushing schedule	MALES *Readership group** I	II	III	FEMALES *Readership group** I	II	III
Once before b'ast	25.8	27.1	29.9	19.6	25.0	33.3
Once after breakfast	32.4	46.6	51.9	46.4	51.6	53.8
Once during day	2.7	2.4	1.4	2.1	1.6	2.1
Once before bed	39.0	23.9	16.8	32.0	21.9	10.8
	100	100	100	100	100	100
Base	182	247	368	97	128	195

* Derived from newspapers reported to be in the household as follows: Group I *Guardian, Independent, Telegraph, Times*; Group II *Daily Express, Mail, Today*; Group III *Mirror, Star, Sun*

Males: χ^2 on original data = 38.7; $p < 0.0001$.

Females: χ^2 on original data = 23.7; $p < 0.01$.

TABLE 9. Percentage distribution of toothbrushing schedule by newspaper readership group in schoolchildren aged 14–15 that brushed their teeth twice per day.

Toothbrushing schedule	MALES *Readership group** I	II	III	FEMALES *Readership group** I	II	III
Before breakfast and during day	0.5	0.6	1.1	0.0	0.7	1.4
After breakfast and during day	0.6	0.6	1.4	0.6	1.9	1.6
Before breakfast and before bed	31.8	31.5	35.3	26.5	28.2	28.1
After breakfast and before bed	66.6	67.1	61.3	72.2	68.7	67.9
	100	100	100	100	100	100
Base	617	677	807	652	670	873

* Derived from newspapers reported to be in the household as follows: Group I *Guardian, Independent, Telegraph, Times*; Group II *Daily Express, Mail, Today*; Group III *Mirror, Star, Sun*

Males: χ^2 on original data comparing Groups I and II combined with Group III = 8.8; $p < 0.05$.

aged 14-15 go to school without having had any breakfast at all. How, then, do the pupils in this group that brush their teeth before they go to school answer the question *When do you brush your teeth?* (See pp. 35–37.)

Variation with newspaper readership group

Looking first at those subjects that brush their teeth once, there are significant differences in toothbrushing schedule between the different readership groups in both sexes (Table 8).

Subjects from Group III (popular tabloid) are more likely to brush their teeth around breakfast time, whereas those from Group I (broadsheet) are more likely to brush their teeth just before bed, although around breakfast is the most frequent time for all groups. The Group II (tabloid) pupils are intermediate in their habits. This seems to indicate that although the toothbrushing of all of these subjects is inadequate, those in the higher readership group are more likely to adopt a more favourable timing for tooth cleaning.

Children in the higher readership group are more likely to adopt a clinically favourable time for cleaning their teeth.

Turning now to those that brush twice per day (Table 9), nearly all subjects in each of the three groups will brush their teeth before bed. The timing of the other occasion around breakfast shows some variation with readership group. The males in Group III (popular tabloid) are a little more likely to brush their teeth before rather than after breakfast, compared with males in the other two groups.

TABLE 10. Percentage distribution of toothbrushing frequency in schoolchildren aged 14–15, by region of the country.

**North & Midlands*: North, North-West, Yorkshire & Humberside, West Midlands, East Midlands*

*** South*: East Anglia, London & South-East; South-West

Toothbrushing frequency per day	MALES Geographical region *North & Midlands**	*South ***	FEMALES Geographical region *North & Midlands**	*South ***
Nil or once	29.1	26.5	13.3	13.9
Twice	61.8	66.8	65.6	71.7
Three or more times	9.1	6.7	21.1	14.4
	100	100	100	100
Base	1326	2407	1380	2249

Males: χ^2 on original data = 29.1; $p < 0.0001$

Females: χ^2 on original data = 14.2; $p < 0.01$

TABLE 11. Percentage distribution of toothbrushing schedule in the North and South of England in schoolchildren aged 14–15 that brush their teeth once per day.

**North & Midlands*: North, North-West, Yorkshire & Humberside, West Midlands, East Midlands*

*** South*: East Anglia, London & South-East; South-West

Toothbrushing schedule	MALES Geographical region *North & Midlands**	*South ***	FEMALES Geographical region *North & Midlands**	*South ***
Once before b'fast	29.9	27.1	33.5	24.0
Once after breakfast	43.9	45.1	49.4	53.0
Once during day	2.6	1.7	1.1	2.0
Once before bed	23.6	26.1	15.9	21.0
	100	100	100	100
Base	351	597	176	300

Males: χ^2 on original data = 2.3; not significant

Females: χ^2 on original data = 5.5; not significant

TABLE 12. Percentage distribution of toothbrushing schedule in the North and South of England in schoolchildren aged 14–15 that brush their teeth twice per day.

**North & Midlands*: North, North-West, Yorkshire & Humberside, West Midlands, East Midlands*

*** South*: East Anglia, London & South-East; South-West

Toothbrushing schedule	MALES Geographical region *North & Midlands**	*South ***	FEMALES Geographical region *North & Midlands**	*South ***
Before breakfast & during day	0.7	0.7	1.5	0.3
After breakfast & during day	1.2	0.7	2.2	1.0
Before breakfast & before bed	36.1	31.0	30.3	25.7
After breakfast & before bed	61.1	66.9	65.1	72.3
	100	100	100	100
Base	819	1608	905	1613

Males: χ^2 on original data = 8.9; $p < 0.05$

Females: χ^2 on original data = 27; $p < 0.001$

Variation with region

It is a common practice to divide the country by a line drawn between the River Severn and The Wash. Dividing our sample in this way, we can see the variation shown in Table 10.

In general, it seems that teenagers in the North and South brush their teeth with different frequency.

In both sexes, a higher percentage of young people living in the South than the North brush their teeth twice a day, but more of those living in the North brush their teeth three or more times per day, compared with those in the South. It is of interest that the 1983 OPCS survey (Todd & Dodd 1985), although it does not describe toothbrushing frequency in the different regions of England, observed higher proportions of subjects brushing three or more times a day in Scotland and Wales, compared with England.

With respect to toothbrushing schedule (Table 11) in those that brush once per day, there is an apparent preference amongst Southern subjects for brushing before bed, but these differences are not statistically significant. The choice of before or after breakfast also shows regional variation in the table, with Northern males and females brushing before breakfast more often, and with Southern females brushing after breakfast.

In those that brush twice per day (Table 12), the preference of those in the North for brushing before breakfast and South for after breakfast is repeated, and in this table is statistically significant.

TABLE 13. Percentage distribution of toothbrushing frequency in schoolchildren aged 14–15, by neighbourhood .

Toothbrushing frequency	MALES Neighbourhood				FEMALES Neighbourhood			
	Country	*Village*	*Town suburbs*	*Town centre*	*Country*	*Village*	*Town suburbs*	*Town centre*
Nil or once	33.3	26.8	27.1	25.7	13.2	14.0	12.5	14.3
Twice	62.6	66.3	63.8	66.0	72.3	72.3	67.6	66.6
3 or more times	4.1	6.9	9.0	8.3	14.5	13.6	19.9	19.1
	100	100	100	100	100	100	100	100
Base	412	1343	1153	818	401	1261	1003	950

Males: χ^2 on original data = 18.6; $p < 0.01$
Females: χ^2 on original data = 22.5; $p < 0.001$

TABLE 14. Percentage distribution of toothbrushing frequency in schoolchildren aged 14–15, by birth order.

Toothbrushing frequency	MALES Birth order			FEMALES Birth order		
	First	*Second*	*Third*	*First*	*Second*	*Third*
Nil or once	26.2	25.9	32.5	12.5	13.0	17.3
Twice	66.3	66.2	60.6	70.8	69.9	65.0
3 or more times	7.5	7.9	7.0	16.7	17.1	17.6
	100	100	100	100	100	100
Base	1571	1389	758	1556	1369	698

Males: χ^2 on original data = 12.5; $p < 0.05$
Females: χ^2 on original data = 11.6; $p < 0.05$

TABLE 15. Percentage distribution of toothbrushing frequency in schoolchildren aged 14–15 in 3-child families, by birth order.

Toothbrushing frequency	MALES Birth order			FEMALES Birth order		
	First	*Second*	*Third*	*First*	*Second*	*Third*
None or once	26.8	25.3	32.7	11.9	11.9	15.5
Twice	64.1	67.4	62.5	71.9	69.0	64.2
3 or more times	9.1	7.3	4.8	16.1	19.1	20.3
	100	100	100	100	100	100
Base	362	328	336	360	335	330

Males: χ^2 on original data = 9.0; $p = 0.06$
Females: χ^2 on original data = 5.4; not significant

Variation with neighbourhood

In order to assess the immediate area in which subjects live, we asked them to select from seven descriptions. Only four were ever used by subjects in this study (Table 13).

Urban dwellers seem to brush their teeth the most frequently.

Toothbrushing frequency shows significant variation with this neighbourhood measure, in both sexes. Brushing three or more times is comparatively uncommon, but is seen rather more often among town dwellers. In the male country dwellers, there is a distinct tendency towards a lower brushing frequency. In a Norwegian study, Traeen and Rise (1990) found no association between toothbrushing frequency and neighbourhood among a sample of young people aged 13–14, although in subjects aged 35–44 those living in urban areas were more likely to show favourable brushing behaviour.

Toothbrushing schedule shows no variation with neighbourhood, controlling for frequency and gender.

Variation with family composition

The family composition questions asked the respondents to identify *(a)* how many children there are in the family, and *(b)* what their own position in the family is. Macgregor & Balding (1987a) report that toothbrushing frequency declines significantly as the number of siblings increases. It is conceivable that this is due to competition for the bathroom, but in any case it is important to note that there are also associations between larger family size and later bedtime (Macgregor & Balding 1988), and between later bedtime and reduced toothbrushing frequency (Macgregor & Balding 1987a and below).

We have repeated this analysis and refined it by analysing the sexes separately. No significant effect of family size on toothbrushing was found. There is a χ^2 value significant at 0.08 for the females (not shown) in the same direction as our earlier study, which combined the sexes. It is obviously preferable to perform separate analyses.

In the next table, Table 14, we examine the relation between the subjects' position in the family in relation to brushing frequency. There are significant associations in both sexes.

The later children in a family tend to brush their teeth less often than the earlier ones do.

Here we see that those born later (third or more) are inclined to brush less often. This is interesting, because it may explain some of our earlier studies on family size, since one cannot be third in a family of two.

In order to examine this we have looked at the effect of birth order in two-child families as a separate group, but here no effect of birth order could be found (not shown).

Among male children from three-child families, the effect of birth order is significant at $p = 0.06$ (Table 15), and is in the direction of later children brushing less frequently. The effect in females is not so clear, in that female children third in a family of three are most likely to have brushed not at all or once, and also are the most likely to brush three or more times.

We were unable to detect any variation of toothbrushing schedule with family composition. We also examined family type with respect to which parents live at home with the subject, by asking pupils to identify which combination from a list most closely describes their situation. No significant differences were found.

Toothbrushing schedule	MALES Time of getting up					FEMALES Time of getting up				
	By 6.30	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*	*By 6.30*	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*
Before breakfast	23.0	25.7	33.3	23.3	30.6	17.9	18.9	31.0	34.7	33.3
After breakfast	48.4	49.7	42.9	47.5	31.5	51.3	63.6	47.1	47.4	47.6
During day	4.8	1.0	1.4	0.9	5.6	2.6	1.5	1.1	1.1	9.5
Before bed	23.8	23.6	22.4	28.3	32.4	28.2	15.9	20.9	16.8	9.5
	100	100	100	100	100	100	100	100	100	100
Base	126	191	294	219	108	39	132	187	95	21

Males: χ^2 on original data = 30.4; p <0.01
Females: χ^2 on original data = 25.0; p <0.05

TABLE 16. Percentage distribution of toothbrushing schedule by time of getting up, in schoolchildren aged 14–15 that brush their teeth once per day.

Toothbrushing schedule	MALES Time of getting up					FEMALES Time of getting up				
	By 6.30	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*	*By 6.30*	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*
Before breakfast & before bed	27.6	32.8	32.3	36.6	46.7	25.2	23.7	29.0	33.5	48.2
After breakfast & before bed	72.4	67.2	67.7	63.4	53.3	74.8	76.3	71.0	66.5	51.8
	100	100	100	100	100	100	100	100	100	100
Base	395	521	774	492	167	294	769	906	397	83

Males: χ^2 on original data = 21.9; p <0.001
Females: χ^2 on original data = 31.3; p <0.0001

TABLE 17. Percentage distribution of toothbrushing schedule by time of getting up, in schoolchildren aged 14–15 that brush their teeth twice per day.

Toothbrushing schedule	MALES Time of going to bed					FEMALES Time of going to bed				
	By 10.00	*By 10.30*	*By 11.00*	*By 11.30*	*After 11.30*	*By 10.00*	*By 10.30*	*By 11.00*	*By 11.30*	*After 11.30*
Before breakfast & before bed	31.1	31.1	32.0	34.1	41.6	26.6	29.0	26.8	29.3	31.5
After breakfast & before bed	68.9	68.9	68.0	65.9	58.4	73.4	71.0	73.2	70.7	68.5
	100	100	100	100	100	100	100	100	100	100
Base	576	518	519	334	392	668	634	542	290	311

Males: χ^2 on original data = 21.9; p <0.001
Females: χ^2 on original data = 31.3; p <0.0001

TABLE 18. Percentage distribution of toothbrushing schedule in relation to breakfast by time of going to bed in schoolchildren aged 14–15 that brush their teeth twice per day.

Lifestyle

Variation with bedtime habits

Young people with late bedtimes tend to brush their teeth less often.

The young people were asked the time they went to bed on the previous night and the time they got up that morning. We have published data elsewhere (Macgregor & Balding 1987a) showing that later bedtimes are associated with lower frequencies of toothbrushing.

Among males that brush only once, late risers are more likely to brush their teeth at night than in the morning, which is not unexpected (Table 16).

Among late-rising females from the same sample, there is a distinct preference for brushing before rather than after breakfast. Did they in fact have any breakfast? And if not, how do they choose between the toothbrushing options? Removing from the sample all those subjects that had no breakfast, the same patterns are present at a significant level (not shown). Further light is shed on these questions in the next section on breakfasts.

Among males and females that brush twice (Table 17), the same preference for reporting brushing before breakfast among late risers is apparent; this preference also persists when non-breakfasters are excluded from the analysis (not shown).

Bedtimes show no significant associations with toothbrushing schedule in males or females that brush only once. For those that brush twice (Table 18), males that go to bed late (and possibly thus get up late) report brushing before rather than after breakfast. The females show a non-significant trend in the same direction.

TABLE 19. Percentage distribution of toothbrushing frequency in relation to type of breakfast in schoolchildren aged 14-15.

Toothbrushing frequency per day	MALES Type of breakfast					FEMALES Type of breakfast				
	A drink	*Cereal*	*Egg + drink*	*Cooked + drink*	*Other*	*A drink*	*Cereal*	*Egg + drink*	*Cooked + drink*	*Other*
Nil or once	36.6	25.1	15.0	25.4	32.7	14.9	12.9	20.0	12.6	13.4
Twice	57.3	67.7	80.0	65.9	57.8	69.4	69.6	65.7	68.8	71.3
Three or more times	6.1	7.2	5.0	8.7	9.4	15.7	17.5	14.3	18.6	15.3
	100	100	100	100	100	100	100	100	100	100
Base	675	1723	40	1051	223	1206	1234	35	889	268

Males: χ^2 on original data = 46.7; $p < 0.0001$

Females: χ^2 on original data = 7.3; not significant

Variation with breakfast

For the 'breakfast' question a variety of items were offered, from which the pupils selected one response which most closely described that morning's breakfast. We have grouped the various breakfast options into five categories to reduce the number of near-empty cells on the table.

Males that eat a substantial breakfast tend to brush their teeth more often.

There are significant differences in toothbrushing frequency between the categories (Table 19). Broadly speaking, males that have more to eat for breakfast are likely to brush their teeth more frequently. (This is particularly true for those few for whom breakfast was just an egg — anecdotally, we ourselves find that egg yolk is a particularly persistent food which should always prompt a brushing after breakfast.) Amongst the females, who are more likely to brush their teeth twice or more in any event, no differences (significant or otherwise) are seen.

TABLE 20. Percentage distribution of toothbrushing schedule in relation to having breakfast, in schoolchildren aged 14-15 that brush once per day.

Toothbrushing schedule	MALES Breakfast habit		FEMALES Breakfast habit	
	No breakfast	*Had breakfast*	*No breakfast*	*Had breakfast*
Before breakfast	33.3	27.0	40.5	23.5
After breakfast	33.3	46.6	42.3	54.6
During day	2.2	2.1	2.7	1.4
Before bed	31.1	24.3	14.4	20.5
	100	100	100	100
Base	135	822	111	366

Males: χ^2 on original data = 8.3; $p < 0.05$
Females: χ^2 on original data = 14.1; $p < 0.01$

TABLE 21. Percentage distribution of toothbrushing schedule in relation to having breakfast in schoolchildren aged 14-15 that brush twice per day.

Toothbrushing schedule	MALES Breakfast habit		FEMALES Breakfast habit	
	No breakfast	*Had breakfast*	*No breakfast*	*Had breakfast*
Before breakfast and during day	0.9	0.7	1.0	0.7
After breakfast and during day	0.4	0.9	1.4	1.4
Before breakfast and before bed	46.9	31.4	41.2	24.2
After breakfast and before bed	50.0	66.3	55.8	72.9
	100	100	100	100
Base	224	2217	486	2050

Males: χ^2 on original data = 27.4; $p < 0.0001$
Females: χ^2 on original data = 58.2; $p < 0.0001$

Toothbrushing frequency	MALES Smoking habit					FEMALES Smoking habit				
	Never started	*Once or twice*	*Given up*	*Like to stop*	*Not want to stop*	*Never started*	*Once or twice*	*Given up*	*Like to stop*	*Not want to stop*
None or once	25.7	25.9	27.8	32.8	38.2	11.9	13.8	13.8	15.2	20.7
Twice	67.4	66.5	63.9	58.1	54.5	71.4	71.2	67.5	66.5	61.1
Three or more times	6.9	7.6	8.3	9.1	7.3	16.7	15.0	18.7	18.2	18.2
	100	100	100	100	100	100	100	100	100	100
Base	1691	935	543	375	178	1481	820	690	433	203

Males: χ^2 on original data = 24.4; $p < 0.01$
Females: χ^2 on original data = 19.5; $p < 0.05$

TABLE 22. Percentage distribution of toothbrushing frequency in schoolchildren aged 14-15, by smoking habit.

Turning to toothbrushing schedule, males and females that brush once only and had something for breakfast are most likely to time this brushing after breakfast (Table 20). Males and females that brush twice are also likely to time their morning brush after breakfast (Table 21).

We found a significant tendency for males and females that are late to rise or late to bed to miss breakfast (unpublished data, SHEU). This might lie behind the patterns noted in the last section. Looking at those that had no breakfast (Tables 20 and 21), there is no significant difference between those that report their brushing as being 'before breakfast' or 'after breakfast'. *All the associations shown in this section and the previous one (bedtime habits) are still significant when those taking no breakfast on the day of the survey are excluded.*

Variation with smoking

We have previously shown (Macgregor & Balding 1987c) that toothbrushing frequency varies significantly with smoking habit in adolescents, smokers of both sexes brushing their teeth less often than non-smokers. In this study we have examined smoking habit in more detail and discovered a similar pattern.

Smokers brush their teeth less often than non-smokers do.

The smoking question has five categories as shown in Table 22, which cover not just current smoking but also history and attitude to their smoking. The pupils were asked to choose the statement that most closely described their own smoking. The table shows a marked tendency for those that are more heavily involved in smoking to report lower brushing frequencies, whereas those that have never or rarely smoked are more likely to report brushing twice. This is unfortunate, since smoking is now recognised as a risk factor in periodontal disease (Macgregor 1992). In those that brush three times or more, there is if anything a tendency for the smokier males and females to be more likely to be amongst these most diligent brushers.

Interestingly, there are differences between each 'adjacent' category of smoker, and of particular interest are differences between the committed 'do not want to give up' group of smokers and the other groups.

TABLE 23. Percentage distribution of toothbrushing frequency in schoolchildren aged 14-15, by sporting activity index.

Toothbrushing frequency per day	MALES Sporting activity index				FEMALES Sporting activity index			
	0	*1–6*	*7–12*	*13+*	*0*	*1–6*	*7–12*	*13+*
None or once	35.5	30.5	22.5	20.4	18.0	13.9	12.1	8.5
Twice	58.6	63.4	69.1	66.9	68.4	70.1	69.0	67.8
Thrice or more	5.9	6.1	8.4	12.6	13.6	16.0	18.9	23.7
	100	100	100	100	100	100	100	100
Base	338	1918	1003	499	472	2079	784	317

Males: χ^2 on original data = 62.4; p <0.0001
Females: χ^2 on original data = 29.1; p <0.0001

TABLE 24a. Percentage distribution of toothbrushing frequency in male schoolchildren aged 14-15, by dental attendance.

Toothbrushing frequency per day	Last dental attendance *1+ year*	*In past year*	*In past 6 mths.*	*In past 3 mths.*	*In past month*	*In past 7 days*
None or once	46.5	35.7	29.1	21.7	23.9	22.7
Twice	48.0	56.5	64.4	71.4	66.8	65.7
Three or more times	5.4	7.8	6.5	6.9	9.3	11.6
	100	100	100	100	100	100
Base	331	333	939	1075	786	277

χ^2 on original data = 110.4; p <0.0001

TABLE 24b. Percentage distribution of toothbrushing frequency in female schoolchildren aged 14-15, by dental attendance.

Toothbrushing frequency per day	Last dental attendance *1+ year*	*In past year*	*In past 6 mths.*	*In past 3 mths.*	*In past month*	*In past 7 days*
None or once	21.9	18.1	14.7	10.8	12.6	11.5
Twice	65.3	65.4	70.3	71.9	67.8	70.3
Three or more times	12.8	16.5	15.0	17.2	19.6	18.2
Base	219	309	893	1073	811	330

χ^2 on original data = 35.2; p <0.001

Variation with sporting activity

The Health Related Behaviour Questionnaire offers subjects a list of sporting activities such as rugby, squash, swimming and dancing, and asks them to state for each sport how often they take part in each of these activities outside normal lesson time — *more than once a week*, *once a week*, or *at least once a month*. A score was given to each pupil, where each sport ticked *at least once a month* scored 1, *once a week* scored 2 and *more than once a week* scored 3. Sedentary sports on the list (e.g. pool, darts) were excluded from this calculation.

In both sexes toothbrushing frequency rises significantly as participation in these vigorous sports outside school hours increases (Table 23). A similar pattern of results, based on a different sample and slightly different questionnaire, has been reported by Macgregor & Balding (1989).

No association of sports participation with toothbrushing schedule was observed in males or females, and none was expected.

Dental health behaviour

Variation with dental attendance

We asked subjects to identify from a list of options when they last visited the dentist, and what treatment(s) or advice they received on this last visit. The occasion of the last visit is subject to a slight reporting bias, in that it seems subjects will mark the first acceptable option they come to, so that there is a bias in favour of the earlier items in the list (Balding 1992a; see also Box 3).

More recent dental attendance is strongly associated with more frequent brushing in males and females (Tables 24a & 24b). Those who have visited a dentist recently may be more generally health-conscious and thus have dental check-ups and brush more often, or it may be that a more recent visit has an encouraging effect on practice. This encouraging effect may be through greater fear of consequences of neglect, greater salience of oral hygiene, or encouraging advice from the dentist (see below).

Toothbrushing schedule shows a significant variation with dental attendance in once-brushing females, but the distribution of cases amongst cells is highly irregular (not shown). Twice-brushers that visited the dentist more recently show a marginal tendency to brush after rather than before breakfast (not shown).

TABLE 25. Percentage distribution of toothbrushing frequency in schoolchildren aged 14-15, by recalled dental treatment or advice.

*** p <0.001

Recalled treatment or advice	MALES Toothbrushing frequency			FEMALES Toothbrushing frequency		
	Nil or once	*Twice*	*3 times or more*	*Nil or once*	*Twice*	*3 times or more*
Fillings	26.4	20.3	23.8***	29.3	20.0	24.0***
Extractions	6.7	7.0	7.9	6.9	6.5	5.8
Polishing	21.4	20.7	22.6	20.2	21.5	22.8
Brace	11.0	12.9	14.7	14.3	17.6	17.2
Check-up	62.0	73.9	72.5***	67.2	76.2	77.3***
Brushing advice	21.3	19.3	23.4	12.6	11.1	12.5
Flossing advice	2.6	3.3	6.8	2.9	3.1	2.5
Other	10.1	9.4	9.4	9.3	9.2	8.8

TABLE 26. Percentage distribution of newspaper readership group in schoolchildren aged 14-15, by recalled dental treatment or advice.

*** p <0.001
** p <0.01
* p <0.05

Recalled treatment or advice	MALES *Readership group**			FEMALES *Readership group**		
	I	*II*	*III*	*I*	*II*	*III*
Fillings	17.5	21.5	27.1***	18.3	19.1	27.6***
Extractions	6.8	5.9	8.8*	5.6	5.6	7.7
Polishing	21.7	21.3	20.2	22.3	19.0	21.8
Brace	13.8	13.3	10.8	19.2	17.6	15.4
Check-up	73.3	72.3	68.0**	76.9	78.7	71.6**
Brushing advice	22.6	19.4	20.1	12.5	10.7	11.1**
Flossing advice	4.8	3.0	3.1	5.0	2.8	2.1***
Other	9.2	10.2	8.8	8.2	9.5	9.4

* Derived from newspapers reported to be in the household as follows: Group I *Guardian, Independent, Telegraph, Times*; Group II *Daily Express, Mail, Today*; Group III *Mirror, Star, Sun.*

Variation with recalled dental treatment or advice

It is important to appreciate that while many publications use data from dental records, we are here relying on pupils' stated recollection of treatment or advice received (Table 25).

Those males and females brushing not at all or only once on the previous day are rather more likely (***) to have had fillings on the previous visit to the dentist. This may be causal, but other evidence for a direct effect of toothbrushing on dental caries prevalence is inconclusive (Sutcliffe 1989): also possible is some effect based on other associated behaviour patterns, such as sugar consumption.

Variation of recalled dental treatment or advice with newspaper readership

Dental research has long been interested in social class differences in the uptake of dental treatment. [We have reported elsewhere that toothbrushing frequency varies with newspaper readership (Macgregor & Balding 1987a).] Here we have examined differences in recalled dental treatment among our three readership groups (Table 26).

This table shows markedly more of those in the 'lower' group reporting having fillings on their last visit. They are also the group reporting most extractions, although this difference is not large. Those in the 'high' group are more likely to report receiving advice on brushing or flossing. Generally, people from lower social classes have greater incidences of all sorts of ill-health (Townsend & Davidson 1982), and this probably includes dental ill-health (Addy et al. 1990), although Todd & Dodd (1985) found little systematic variation between the proportions of children in different social groups that had ever had a filling. The association of 'high' readership groups with more advice is consistent with other research that seems to show that people from middle-class backgrounds are given more time and more advice when consulting health professionals (Cartwright & O'Brien 1976).

If you want your dentist to advise you on how to brush your teeth, carry a copy of The Times.

Recalled treatment or advice	MALES Toothbrushing schedule				FEMALES Toothbrushing schedule			
	Before b'fast	*After b'fast*	*During day*	*Before bed*	*Before b'fast*	*After b'fast*	*During day*	*Before bed*
Fillings	29.4*	24.6	20.0	25.9*	35.5*	28.4	28.6	21.2*
Extractions	11.0	5.5	10.0	3.0	6.6	7.8	14.3	3.5
Polishing	25.3	15.8	25.0	23.3	23.1	18.9	28.6	21.2
Brace	13.1	10.0	20.0	10.3	17.4	13.2	14.3	16.5
Check-up	60.0	66.2	50.0	62.5	66.1	65.8	71.4	72.9
Brushing advice	22.9	16.5	20.0	22.4	8.3	14.8	0.0	14.1
Flossing advice	2.4	0.8	10.0	5.2	5.0	2.1	0.0	2.4
Other	10.2	9.3	20.0	9.1	8.3	9.5	14.3	7.1

TABLE 27. Percentage distribution of toothbrushing schedule in schoolchildren aged 14-15 that brush once per day, by recalled dental treatment or advice.

* 0.05> p >0.01

Recalled treatment or advice	TOOTHBRUSHING SCHEDULE Before b'fast & during day		After b'fast & during day		Before b'fast & before bed		After b'fast & before bed	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*	*Males*	*Females*
Fillings	38.9*	36.8	9.1	16.7	24.1	20.0	18.3	19.8
Extractions	16.7	26.3	0.0	2.8	7.2	7.0	7.0	6.2
Polishing	22.2	26.3	9.1	22.2	20.6	20.7	21.0	21.8
Brace	22.2	15.8	4.5	8.3	12.3	18.8	13.1	17.3
Check-up	44.4	68.4	81.8*	75.0	69.3	76.4	76.3	76.3
Brushing advice	27.8	10.5	22.7	2.8	19.0	11.7	19.1	11.0
Flossing advice	11.1	0.0	4.5	0.0	3.5	2.5	3.1	3.5
Other	11.1	5.3	9.1	11.1	9.4	6.8	9.5	10.0

TABLE 28. Percentage distribution of toothbrushing schedule in schoolchildren aged 14-15 that brush twice per day, by recalled dental treatment or advice.

* 0.05> p >0.01

Variation of recalled dental treatment or advice with toothbrushing schedule

Table 27 shows an apparently greater likelihood of males that brush their teeth only before breakfast receiving fillings. This sits at odds with current understanding of tooth decay: unbrushed teeth, bearing bacterial plaque, will absorb breakfast carbohydrates into the plaque matrix, resulting in acidification which can lead to dental caries. For this reason, there would seem to be good grounds for brushing the teeth before a meal, to remove plaque (Jenkins 1978). The association does not in fact reach statistical significance, but is intriguing.

There are differences of statistical significance in the once-only table. Males brushing after breakfast are less likely to be given advice on brushing, which may be due to their receiving fewer fillings. Table 28 shows that males brushing twice (including one brush *before* breakfast) are more likely than those brushing twice (with one brush *after* breakfast) to have had fillings on their last visit to the dentist. This difference comfortably achieves statistical significance, and is in the same counter-intuitive direction.

Traeen & Rise (1990) report that advice on brushing has no effect on subsequent brushing behaviour of Finnish teenagers, toothbrushing being influenced more by the dental health norms of the family.

PART III. Motivation for Toothbrushing

TABLE 29. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by newspaper readership group.

Main reason for brushing teeth	MALES *Readership group**			FEMALES *Readership group**		
	I	*II*	*III*	*I*	*II*	*III*
Like teeth looking nice	16.2	17.1	21.1	11.2	13.4	15.3
Avoid false teeth	8.0	9.8	10.8	3.6	3.8	5.8
Like fresh breath	10.1	12.4	12.3	6.8	6.8	7.3
Avoid toothache	32.0	30.3	24.5	31.7	26.9	24.2
Mouth feels clean	33.7	30.4	31.2	46.7	49.1	47.4
	100	100	100	100	100	100
Base	845	951	1231	886	951	1248

* Derived from newspapers reported to be in the household as follows: Group I *Guardian, Independent, Telegraph, Times*; Group II *Daily Express, Mail, Today*; Group III *Mirror, Star, Sun.*

Males: χ^2 on original data = 27.8; $p < 0.001$

Females: χ^2 on original data = 25.2; $p < 0.01$

TABLE 30. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by region of the country.

Main reason for brushing teeth	MALES Region *North & Midlands**	*South**	FEMALES Region *North & Midlands**	*South**
Like teeth looking nice	21.1	16.9	15.2	12.7
Avoid false teeth	10.3	9.4	5.8	3.7
Like fresh breath	11.8	12.0	5.8	7.8
Avoid toothache	27.0	29.0	24.4	28.8
Mouth feels clean	29.8	32.7	48.8	47.0
	100	100	100	100
Base	1249	2254	1334	2164

* Based on the standard regions of England:

North & Midlands: North, North-West, Yorkshire & Humberside, West Midlands, East Midlands

South: East Anglia, London & South-East, South-West

Males: χ^2 on original data = 15.4; $p = 0.05$

Females: χ^2 on original data = 28.1; $p < 0.001$

Introduction

The sample and methods for this part are the same as for Part II (see pp. 7–9 and 21).

Information about motivation for toothbrushing was obtained by offering a selection of reasons for brushing teeth, from which subjects were asked to pick the one which most closely represented their main reason for cleaning their teeth. The question has had a long history of use in the survey method and year by year the proportions of young people choosing particular options from different parts of the country are remarkably stable (Balding 1992a).

Demographic variation

Variation with gender and newspaper readership

We have reported significant variation of motivation for brushing with gender in two other studies using Version 10 of the questionnaire (Macgregor & Balding 1987b, Macgregor & Balding 1991). These differences are also present here (Table 29): males are more likely to identify good appearance and avoiding bad breath as their main reason for brushing, while the highest proportion of females brush to make the mouth feel clean.

Boys and girls brush their teeth for different reasons.

There is significant variation of toothbrushing motivation with newspaper readership group in males and females (Table 29). Males and females from Group I are the most likely to choose 'avoiding toothache' as their main reason, and Group I males are also most likely to choose 'mouth feels clean'. By contrast, Group I females are (just) the least likely to choose this 'feeling clean' option. Males and females from Group III are consistently the most likely of the three groups to choose the 'teeth looking nice' and 'avoid false teeth' reasons. 'Fresh breath' as a reason seems slightly more popular among males and females from Groups II and III than Group I.

No significant differences were found between the different ethnic groups in our study.

Variation with region

Regional variation is apparent in the reasons chosen for brushing the teeth (Table 30). 'Teeth looking nice' is chosen more often by Northern males and females, while 'avoiding toothache' is more often chosen by Southern pupils.

'Mouth feeling clean' is chosen more often by Southern males, a regional difference which, if anything, is reversed in females.

TABLE 31. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by neighbourhood.

Main reason for brushing teeth	MALES Neighbourhood *Country*	*Village*	*Town suburbs*	*Town centre*	FEMALES Neighbourhood *Country*	*Village*	*Town suburbs*	*Town centre*
Teeth look nice	22.2	15.7	18.2	21.3	11.5	11.9	14.4	15.7
Avoid false teeth	10.0	9.4	10.3	9.6	3.9	4.0	5.2	4.9
Like fresh breath	11.6	12.6	11.6	11.1	4.7	7.3	6.9	7.7
Avoid toothache	27.7	30.5	28.1	25.1	29.4	29.1	24.4	26.4
Mouth feels clean	28.5	31.8	31.9	32.9	50.4	47.7	49.1	45.3
	100	100	100	100	100	100	100	100
Base	379	1282	1089	764	381	1239	978	905

Males: χ^2 on original data = 19.7; p = 0.07
Females: χ^2 on original data = 20.2; p = 0.06

TABLE 32. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by number of children in the family.

Main reason for brushing teeth	MALES Number of children in family *One*	*Two*	*Three*	*Four or more*	FEMALES Number of children in family *One*	*Two*	*Three*	*Four or more*
Teeth look nice	21.8	16.7	18.2	20.6	11.4	13.7	13.1	14.4
Avoid false teeth	8.4	10.3	8.2	11.4	3.4	4.0	5.2	5.3
Like fresh breath	10.1	10.8	13.0	13.5	5.1	6.5	7.6	8.3
Avoid toothache	29.4	29.7	29.2	24.1	27.0	29.9	23.8	25.2
Mouth feels clean	30.3	32.6	31.5	30.4	53.2	45.9	50.3	46.7
	100	100	100	100	100	100	100	100
Base	238	1609	979	665	237	1668	1001	599

Males: χ^2 on original data = 16.4; p <0.05
Females: χ^2 on original data = 8.2; not significant

Variation with neighbourhood

The variations seen in Table 31 approach but do not meet the 0.05 criterion for statistical significance. Interestingly, some differences which may contribute to this near-significance among the males seem to be reversed among the females! For example, country home locations are where 'look nice' is chosen most often among the males; among the females, country folk are the least likely to choose this option. Other anomalies can be found by inspecting the table.

Variation with family composition

Significant variation with family composition was observed with respect to toothbrushing motivation (Table 32). Again, males and females show rather different patterns of association, although the differences observed are not large.

Males and females from largest (4+ children) families are the most likely to choose 'avoid false teeth' and 'fresh breath' as their main reason for cleaning their teeth, but these are less common choices. Only-children who are male are more likely to identify as their main reason 'look nice', whereas sole female children opt for 'feel clean' and those females from larger families choose 'look nice'.

TABLE 33. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by birth order.

Main reason for brushing teeth	MALES Birth order *1st*	*2nd*	*3rd or later*	FEMALES Birth order *1st*	*2nd*	*3rd or later*
Teeth look nice	17.3	18.2	20.2	14.1	12.3	14.1
Avoid false teeth	9.6	9.7	10.7	3.9	4.8	5.3
Like fresh breath	12.0	11.8	12.2	5.9	7.2	9.2
Avoid toothache	29.5	27.4	27.4	29.0	27.9	21.5
Mouth feels clean	31.6	33.0	29.5	47.0	47.8	50.0
	100	100	100	100	100	100
Base	1486	1305	719	1520	1322	666

Males: χ^2 on original data = 7.9; not significant
Females: χ^2 on original data = 26.4; p <0.01

TABLE 34. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by parents living at home.

Main reason for brushing teeth	MALES Parents living at home *Lone parent*	*Both natural parents*	*Other combin-ations*	FEMALES Parents living at home *Lone parent*	*Both natural parents*	*Other combin-ations*
Teeth look nice	18.5	18.2	18.7	13.0	13.3	15.5
Avoid false teeth	9.4	9.7	10.8	5.7	4.3	5.0
Like fresh breath	12.6	10.9	16.6	7.3	6.8	7.5
Avoid toothache	24.5	29.4	25.1	24.2	28.2	24.2
Mouth feels clean	34.9	31.8	28.7	49.8	47.5	47.8
	100	100	100	100	100	100
Base	372	2643	529	422	2630	483

Males: χ^2 on original data = 20.4; p <0.01
Females: χ^2 on original data = 8.1; not significant

TABLE 35. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by time of getting up.

Main reason for brushing teeth	MALES Time of getting up *By 6.30*	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*	FEMALES Time of getting up *By 6.30*	*By 7.00*	*By 7.30*	*By 8.00*	*After 8.00*
Teeth look nice	16.2	16.8	17.3	20.2	24.7	10.9	12.3	13.6	15.5	20.6
Avoid false teeth	10.9	7.5	10.8	9.6	10.2	3.5	4.5	4.9	4.2	4.6
Like fresh breath	12.0	12.3	11.1	11.3	17.1	8.2	7.5	5.9	7.4	7.6
Avoid toothache	27.0	30.4	29.8	28.0	20.7	26.3	28.9	28.3	23.3	22.1
Mouth feels clean	33.9	33.1	31.0	31.0	27.3	51.1	46.7	47.3	49.5	45.0
	100	100	100	100	100	100	100	100	100	100
Base	567	774	1106	743	304	403	1047	1320	618	131

Males: χ^2 on original data = 39.2; p <0.01
Females: χ^2 on original data = 30.0; p = 0.07

Looking at birth order (Table 33), males and females who are first or only children are rather more likely than others to choose 'avoid toothache'. Only for females does the χ^2 value reach statistical significance.

First-borns like to avoid toothache.

Children that live with both parents are also the ones who most often picked 'avoid toothache' in Table 34. Here males show a significant χ^2 value, but the tables for males and females are similar in their pattern. Male and female children of lone parents most often choose 'mouth feel clean'.

Lifestyle

Variation with bedtime habits

Motivation for toothbrushing shows some interesting variation with time of getting up in males (Table 35), such that the early risers more often select 'mouth feel clean' and the later risers more often select 'teeth looking nice' and 'fresh breath'. In the females there is a similar pattern with respect to 'mouth feel clean' and 'teeth look nice' (although these differences are not quite significant at the $p = 0.05$ level), but the 'fresh breath' option shows no clear association with time of getting up.

Early risers like their mouths to feel clean.

Bedtime shows some apparent associations with motivation (not shown). Females that go to bed late (after 11.30 pm) are significantly more likely to opt for 'teeth looking nice', the males showing a similar but non-significant trend.

Variation with breakfast

Breakfast choices and motivation for toothbrushing show significant associations (not shown) where males that have nothing or only a drink for breakfast say they brush their teeth in order for them to look nice ($p < 0.001$). Females also show this difference, but here the table does not have a significant χ^2 value ($p = 0.09$).

TABLE 36. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by smoking habit.

Main reason for brushing teeth	MALES Smoking habit					FEMALES Smoking habit				
	Never started	*Once/ twice*	*Given up*	*Like to stop*	*Not want to stop*	*Never started*	*Once/ twice*	*Given up*	*Like to stop*	*Not want to stop*
Teeth look nice	16.4	18.2	19.2	21.7	27.4	11.5	12.3	15.3	17.4	20.6
Avoid false teeth	10.2	10.1	7.8	10.1	9.8	4.1	6.0	4.2	4.4	2.6
Like fresh breath	9.3	11.1	17.5	14.7	20.1	5.2	6.6	8.9	8.8	11.6
Avoid toothache	33.1	27.9	22.7	21.4	13.4	33.3	26.4	21.1	20.1	20.1
Mouth feels clean	31.0	32.7	32.7	32.1	29.3	46.0	48.8	50.5	49.3	45.0
	100	100	100	100	100	100	100	100	100	100
Base	1614	881	510	346	164	1455	800	662	408	189

Males: χ^2 on original data = 88.4; $p < 0.0001$
Females: χ^2 on original data = 85.2; $p < 0.0001$

TABLE 37. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by sporting activity.

Main reason for brushing teeth	MALES Sporting activity index				FEMALES Sporting activity index			
	Zero	*1–6*	*7–12*	*13+*	*Zero*	*1–6*	*7–12*	*13+*
Like teeth looking nice	18.2	17.3	18.3	22.6	11.3	13.7	13.8	15.8
Avoid false teeth	10.6	9.9	10.2	8.1	4.2	4.6	4.1	5.4
Like fresh breath	12.6	12.1	11.3	12.5	8.4	6.1	7.6	9.1
Avoid toothache	29.9	30.7	25.5	22.8	25.2	27.9	27.6	24.5
Mouth feels clean	28.7	30.0	34.7	34.0	50.9	47.7	46.9	45.3
	100	100	100	100	100	100	100	100
Base	341	1808	939	456	477	2013	747	298

Males: χ^2 on original data = 25.4; $p < 0.05$
Females: χ^2 on original data = 13.0; not significant

Variation with smoking

We have already reported significant differences in toothbrushing motivation between smokers and non-smokers, using a different sample and an earlier version of the questionnaire (Macgregor & Balding 1987c). Male and female smokers in that study chose 'breath smell clean' and 'teeth look nice' more frequently than non-smokers did, non-smokers opting more for 'avoid toothache'.

Smokers want their teeth to look nice and their breath to smell clean.

In Table 36 we present a more detailed way of presenting smoking habit (as above) and again observe significant differences between the smoking categories.

The most committed smokers (who do not want to stop) are the subjects most likely to choose 'teeth looking nice' and 'like fresh breath' as their main reason for cleaning their teeth, whereas 'avoid toothache' is chosen most often by the never-smokers. This pattern of differences is present in both males and females, and the χ^2 values are highly significant.

As above, there are often marked differences among the smokers, between those smokers that say they do and do not want to give up. These young smokers seem significantly different in ways other than their attitude to smoking, and perhaps should be treated differently with respect to dental health education. These differences may have their origins in local culture or individual personality and may have implications for the way they receive certain dental and other health education messages. It would be interesting to discover if these differences persist into adulthood.

Variation with sporting activity

Subjects were assigned an index of sporting activity, as described on page 39. Table 37 shows that high scorers are the subjects most likely to pick 'teeth looking nice' as their main reason for cleaning their teeth in both sexes, although only males show significant χ^2 value.

Sporty people want their teeth to look nice.

High-scoring males seem most likely to be motivated by 'mouth feeling clean', whereas low-scoring males opt for 'avoid toothache' more often than their sportier peers. These patterns are absent or even reversed for females.

TABLE 38.
Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by confidence when meeting new people of the opposite sex.

Main reason for brushing teeth	MALE Confidence with females *Very uneasy*	*A little uneasy*	*At ease*	FEMALE Confidence with males *Very uneasy*	*A little uneasy*	*At ease*
Teeth look nice	13.8	17.2	20.1	14.9	12.6	14.6
Avoid false teeth	12.1	10.0	9.1	5.4	3.9	5.1
Like fresh breath	15.6	12.1	11.4	6.3	6.9	7.3
Avoid toothache	28.6	30.0	26.2	31.2	28.7	24.6
Mouth feels clean	29.9	30.7	33.2	42.1	47.9	48.5
	100	100	100	100	100	100
Base	224	1782	1514	221	1845	1458

Males: χ^2 on original data = 17.4; $p < 0.05$
Females: χ^2 on original data = 14.4; $p = 0.07$

TABLE 39.
Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by whether or not they have a current boyfriend or girlfriend.

Main reason for brushing teeth	MALE Current girlfriend *No*	*Yes*	FEMALE Current boyfriend *No*	*Yes*
Teeth look nice	16.8	22.7	12.5	15.6
Avoid false teeth	10.0	9.1	4.6	3.9
Like fresh breath	11.7	12.6	6.4	8.1
Avoid toothache	30.5	21.5	28.6	24.4
Mouth feels clean	30.9	34.2	47.8	47.9
	100	100	100	100
Base	2637	881	2367	1144

Males: χ^2 on original data = 34.8; $p < 0.0001$
Females: χ^2 on original data = 15.0; $p < 0.01$

TABLE 40.
Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, by toothbrushing frequency.

Main reason for brushing teeth	MALE Toothbrushing frequency *Nil or once*	*Twice*	*3 times or more*	FEMALE Toothbrushing frequency *Nil or once*	*Twice*	*3 times or more*
Teeth look nice	19.9	17.7	19.4	15.0	13.2	14.2
Avoid false teeth	12.1	9.3	6.3	5.6	4.6	3.7
Like fresh breath	15.2	10.3	12.6	9.6	7.1	4.4
Avoid toothache	28.6	28.4	24.9	26.3	28.5	22.6
Mouth feels clean	24.2	34.3	36.8	43.5	46.6	55.1
	100	100	100	100	100	100
Base	979	2286	253	480	2436	593

Males: χ^2 on original data = 50.3; $p < 0.0001$
Females: χ^2 on original data = 29.2; $p < 0.001$

Variation with social relationships

We asked subjects to say how confident they were when meeting people of the same age and of the opposite sex, and the results are shown in Table 38. Males show a significant variation of motivation with social confidence, while variation among females approaches the 0.05 significance criterion. They are not patterned in the same way as with the males.

Positive teenagers brush for positive reasons.

Males confident with meeting new members of the opposite sex are more likely than shyer males to opt for the positive reasons of 'teeth look nice' and 'mouth feel clean', whereas 'very uneasy' males more often choose 'avoid false teeth' and 'like fresh breath'. As it happens, females that also said they were 'very uneasy' are also the ones who most often choose 'avoid false teeth', but this difference is marginal. These less confident females are also more likely to identify 'avoid toothache' as their main reason for toothbrushing.

We might generalise and say that the more confident young people are the most likely to report being motivated by positive, social reasons for cleaning their teeth, whereas shyer pupils are more likely than their peers to choose the more negative 'avoidance' reasons.

We also asked whether the subject had a current boyfriend or girlfriend (Table 39).

Those with a current partner choose in a significantly different way between the reasons offered. Males with a girlfriend are more likely than those without to choose 'teeth looking nice' and 'mouth feel clean' — the same positive reasons — whereas those without are more likely to opt for 'avoid toothache'. A similar pattern is seen among the females, where those females with a boyfriend more often choose 'teeth looking nice' and 'fresh breath', those without a current boyfriend more often choosing 'avoid toothache'.

Dental health behaviour

Variation with toothbrushing habits

We have previously published (Macgregor & Balding 1987b) our observation that the more frequent brushers (three times or more per day) most often opt for 'teeth feel clean', and do so more often than their less diligent peers (true for both sexes, but not significantly for the females).

Here we have very much the same pattern of results (Table 40), and the χ^2 values are significant in both males and females. We might also point to the less frequent brushers (nil/once per day), who seem to opt for 'like fresh breath' more often than those that brush more frequently: this is consistent with the results of Macgregor & Balding (1987b).

TABLE 41. Percentage distribution of toothbrushing motivation in relation to toothbrushing schedule, in schoolchildren aged 14-15 that brush their teeth once per day.

	MALES				FEMALES			
	Toothbrushing schedule				Toothbrushing schedule			
Main reason for brushing teeth	*Before b'fast*	*After b'fast*	*During day*	*Before bed*	*Before b'fast*	*After b'fast*	*During day*	*Before bed*
Teeth look nice	21.8	20.2	26.3	16.2	16.4	16.2	25.0	10.0
Avoid false teeth	10.5	9.8	10.5	16.2	3.1	6.4	0.0	5.6
Like fresh breath	16.0	15.9	42.1	10.3	8.6	9.8	25.0	8.9
Avoid toothache	24.9	26.1	15.8	38.9	19.5	23.8	12.5	42.2
Mouth feels clean	26.8	28.0	5.3	18.4	52.3	43.8	37.5	33.3
	100	100	100	100	100	100	100	100
Base	257	410	19	234	128	235	8	90

Males: χ^2 on original data = 42.2; $p < 0.0001$
Females: χ^2 on original data = 23.3; $p < 0.05$

TABLE 42. Percentage distribution of toothbrushing motivation in relation to toothbrushing schedule, in schoolchildren aged 14-15 that brush their teeth twice per day.

	MALES		FEMALES	
	Toothbrushing schedule		Toothbrushing schedule	
Main reason for brushing teeth	*Before b'fast & before bed*	*After b'fast & before bed*	*Before b'fast & before bed*	*After b'fast & before bed*
Like teeth looking nice	19.5	16.8	15.8	12.4
Avoid false teeth	8.5	9.5	3.6	5.1
Like fresh breath	12.1	9.4	6.9	7.0
Avoid toothache	25.2	30.1	26.1	29.9
Mouth feels clean	34.6	34.2	47.6	45.7
	100.0	100.0	100.0	100.0
Base	742	1491	670	1697

Males: χ^2 on original data = 10.6; $p < 0.05$
Females: χ^2 on original data = 9.3; $p < 0.05$

We have examined toothbrushing schedule, as before, separately for those brushing once per day or twice per day (Table 41). Males and females that brush once per day differ in their motivation, depending on when they brush their teeth. Few subjects brush once 'during the day', and this group has been ignored for the purposes of interpretation. Those brushing in the morning (before or after breakfast) seem to favour more positive reasons (teeth looking nice, fresh breath and mouth feeling clean) whereas those brushing only before bed brush more for negative, though dental health-promoting, reasons (avoid toothache and false teeth).

Among the twice-brushers, the two most common responses are to brush either before breakfast and before bed, or after breakfast and before bed. Table 42 shows variation of motivation between these two patterns of brushing behaviour. Again the social reasons and the dental health-promoting reasons separate out to some extent, with the former being chosen more often by the before breakfast/before bed group, and the latter by the after breakfast/before bed group.

We might have expected the 'mouth feel clean' reason to be associated with brushing after breakfast, but in fact it seems to be associated with the before-breakfast pattern. Looking back at the once-only brushers (Table 41), there is no separation of 'mouth feel clean' in the expected direction among the before and after breakfast groups, and among the females the before-breakfast group opts more for 'mouth feel clean' than the after-breakfast group does.

Variation with dental attendance

Motivation for toothbrushing varied significantly with dental attendance among males only, and even here the differences are small and of little consequence (not shown). We did observe that more recent dental attendance is associated with greater proportions of males choosing 'avoid toothache'. This pattern was observed in females too, although here there is no significant χ^2 value.

If you have seen the dentist recently, is toothache more on your mind?

It is stated by Hawley & Holloway (1992) that for young people a desirable frequency of dental visits is twice per year: we are happy to endorse this.

Recalled treatment or advice	*Like teeth looking nice*		*Avoid false teeth*		*Like fresh breath*		*Avoid toothache*		*Mouth feel clean*	
	M	F	M	F	M	F	M	F	M	F
Fillings	27.3**	24.7**	23.8**	21.7**	20.6**	25.4**	21.7**	22.1**	18.8**	19.6**
Extractions	7.6	6.1	5.9	9.9	8.9	5.2	7.1	7.8	6.5	5.4
Polishing	21.7	24.5	21.6	21.1	21.8	22.8	20.2	20.4	20.6	21.2
Brace	12.1	18.2	13.3	11.2	14.0	21.6	10.0	16.2	14.4	17.2
Check-up	67.1**	70.8	66.7**	71.1	69.0**	69.8	72.8**	76.8	74.8**	77.6
Brushing advice	23.1	11.5	22.5	11.8	22.1	12.5	18.8	10.4	18.4	11.8
Flossing advice	5.0	1.9	2.8	1.3	2.5	2.6	3.5	3.8	2.8	2.9
Other	9.3	7.8	9.9	8.6	9.9	7.8	9.4	9.5	9.5	9.8

M = Males
F = Females

TABLE 43. Percentage distribution of toothbrushing motivation in schoolchildren aged 14-15, in relation to recalled dental treatment or advice.
** $p < 0.01 > 0.001$

Variation with recalled dental treatment or advice

We examined the list of recalled treatments and advice received at the last dental visit against the young people's motivation for toothbrushing, and some significant differences were found (Table 43).

Advice and fillings go with 'teeth look nice'.

If males had a filling on the last visit, they are more likely to say that they clean their teeth in order to keep their teeth looking nice. Looking nice also was important to those males who had received brushing advice. Where having a routine check-up was identified by males and females, the reasons 'avoid toothache' and 'mouth feel clean' were chosen more often.

We might suggest that the most recent experience of dentistry may alter these young people's perceptions of the most important reason for cleaning their teeth — for example, a recent filling may well increase the salience of the appearance of the teeth. The other associations are harder to interpret with confidence.

PART IV. Discussion and Conclusions

TABLE 44. Tabular and visual summary of results for toothbrushing frequency.

* Macgregor & Balding 1991.
§ Regis et al 1994.
‡ Macgregor & Balding 1987a.

Higher frequency	*Lower frequency*
Being female	Large family size/late birth order
Broadsheet newspaper group	Get up late, go to bed late (‡)
Town dwellers	Smokers, and more committed smokers
Eat more for breakfast (m)	
Sporting activity	
Recent dental visit	
High self-esteem (*)	
Internal perceived control (m) (§)	

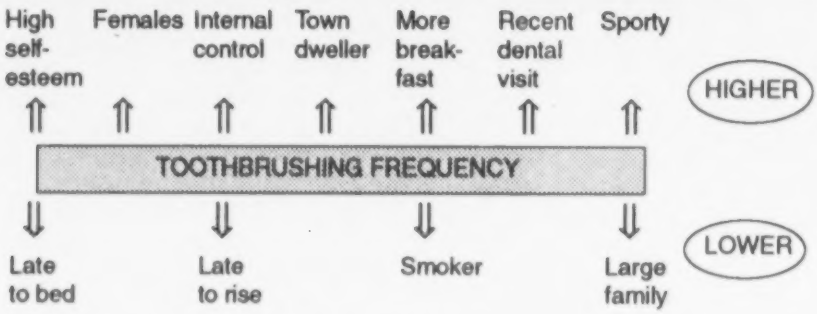
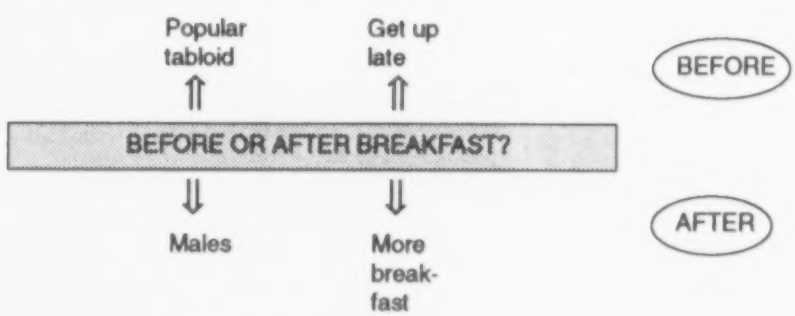


TABLE 45. Tabular and visual summaries of results for toothbrushing schedule: once daily and twice daily brushers.

Once daily			Twice daily	
Before breakfast only	*After breakfast only*	*Before bed only*	*Before breakfast & before bed*	*After breakfast & before bed*
	Males	Females		Females
Popular tabloid	Popular tabloid	Broadsheet	Popular tabloid (m)	
Northerners	Southerners			
Get up late (f)		Get up late	Get up late	
			Go to bed late	
	More breakfast			More breakfast
Fillings/advice (m)				

(m) Males only
(f) Females only



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Introduction

This study has provided detailed information about toothbrushing behaviour and motivation in young people. The results are of interest in their detail, and so we have presented them in a tabular form throughout. Before commenting on the broader issues and conclusions we have also attempted to achieve a 'bird's eye view' of the significant results in Tables 44–46.

Toothbrushing frequency

We can conclude firstly that toothbrushing does not come in a box isolated from the web of interconnected factors which comprise a young person's lifestyle. This is consistent with our earlier studies and with the work of other authors. Moreover, these connections are systematic in the patterns they display.

From Table 44 it is tempting to speculate that the groups with better toothbrushing practices (broadsheet readers, town-dwellers, etc.), have something in common.

Toothbrushing schedule: mindless or mindful?

Toothbrushing schedule is a relatively new area of enquiry for us, and indeed is a relatively unstudied dimension of dental health behaviour. In the course of this work (Table 45) we have identified, among other things, systematic associations of factors with whether once-only brushers choose before or after breakfast, or before bed, for their brushing, and whether the twice-brushers will brush before or after breakfast as well as at night. Morning brushing by once-only brushers fits with the reasons they declare for their brushing (personal and social comfort). Choosing to brush after breakfast (among once- and twice-brushers) seems directly affected by the choice of breakfast, which is not unexpected.

The brushing before bed of once-only brushers is associated with broadsheet readership, and with brushing for preventative dental health reasons. Because salivation virtually ceases during sleep, plaque persists on the tooth surface and therefore promotes plaque-associated diseases. For this reason, if brushing is to be undertaken only once, then just before sleep seems a sensible time to do it.

So, far from being a matter of 'mindless' habit, the placing of toothbrushing in the daily schedule seems to be consistent with the most salient reasons seen by these young people for their brushing. It may be set within a pattern of family norms, but the consistency with declared reasons suggests that this too may be highly mindful.

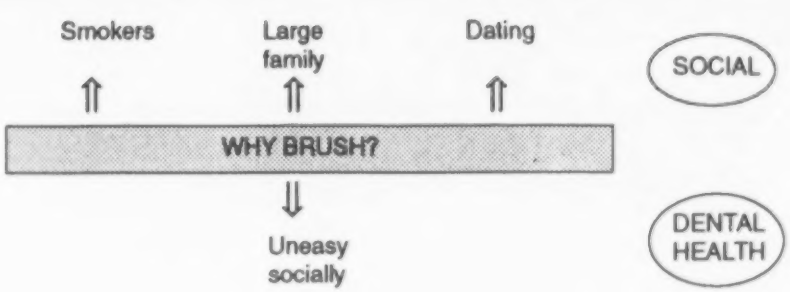
TABLE 46. Tabular and visual summaries of results for toothbrushing motivation.

Mouth feel clean	*Teeth look nice*	*Breath smell fresh*	*Avoid toothache*	*Avoid false teeth*
Females	Males	Males		
Broadsheet (m)	Popular tabloid	Not broadsheet	Broadsheet	Popular tabloid
Southerners (m)	Northerners		Southerners	Northerners
	Larger family (f)	Large family		Large family
Only child (f)	Only child (m)		First/only child	
Live with lone parent			Live with both natural parents	
Early risers	Late risers	Late risers (m)		
	Late to bed (f)			
	No or only little breakfast			
	Smokers	Smokers	Never-smokers	
Sport activity (m)	Sport activity (m)		Not sporty (m)	
At ease (m)	At ease (m)		Uneasy (f)	Uneasy (f)
Current partner	Current partner	Current partner (f)	No partner	
More tooth-brushing	Less tooth-brushing	Less tooth-brushing	More recent visit to dentist	
Routine inspection	Fillings (m)		Routine inspection	
Higher self-esteem (*)	Brushing advice			
1 morning brush	1 morning brush	1 morning brush	1 brush before bed	1 brush before bed
Brush before breakfast & at night			Brush after breakfast & at night	

* Macgregor & Balding 1991.

(m) Males only

(f) Females only



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Motivation

What motivates good dental behaviour? We know from this and other work that the reported motivation of the more diligent brushers tends to be to keep the mouth feeling clean — that is, for a positive æsthetic reason rather than as a preventative dental health measure. The once-only brushers opt more often for socially-instrumental reasons such as 'like fresh breath' and 'teeth looking nice'.

Avoiding false teeth

There are systematic differences in motivation for toothbrushing. The option 'avoid false teeth' is the least common, but is selected more often by Northerners, readers of popular tabloids and those from large families. We know from national surveys that in the North of England, in 1968, half the adult population had no teeth, and it may be that this cautioning example has an effect on children being brought up by adults who have no teeth of their own.

In the North of England, in 1968, half the adult population had no teeth.

Teeth looking nice or breath smelling fresh

These motives — which may be characterised as positive and social rather than to do with preventative dental health — are favoured by popular tabloid readers, Northerners, children from large families, smokers, and those late to bed. Again, it is tempting to speculate that these groups have something in common.

Mouth feeling clean

This motive seems to be chosen by Southerners, broadsheet readers, those with high sporting scores, and others with a confident and active social life.

Avoiding toothache

This preventative dental health reason is also preferred by Southerners, broadsheet readers, first or only children, and children living with both natural parents. This may be related to a generally more confident, controlling and long-term view of health and life in general held by these groups of people, where an optimism about the possibility of avoiding ill-health persists. The less confident, those without a boyfriend, and the unsporty also opt for this reason — perhaps because they fear the consequences more, rather than their being more confident of doing something about it.

There are thus contradictory tendencies in some of these findings where we attempt to generalise across particular reasons for toothbrushing. This may make us more tolerant of the confused pattern of findings arising from Table 46.

TABLE 47. Percentages of schoolchildren aged 14-15, showing reported demographic, behavioural and dental care attributes by grouped self-esteem score.

	MALES				FEMALES			
	Self-esteem values				Self-esteem values			
	Low	*Moderate*		*High*	*Low*	*Moderate*		*High*
Reported attribute	0-10	11-13	14-16	17-20	0-10	11-13	14-16	17-20
Brush teeth twice or more daily	60.4	65.4	70.7	75.1	78.0	79.9	85.2	87.0
Visited dentist in last 6 months	71.7	76.6	79.3	82.3	78.3	79.0	83.2	85.6
Fillings on last visit	23.7	22.3	20.4	16.4	23.0	23.3	19.5	17.3
Broadsheet newspaper	19.4	20.2	23.3	28.0	20.4	20.1	26.0	29.6
Southerner	59.1	63.0	60.7	62.2	64.3	59.4	56.8	58.9
City dweller	22.4	22.2	21.5	21.5	29.8	24.6	25.7	25.5
Both parents live at home	66.8	71.4	75.5	78.8	67.2	72.3	75.1	78.6
Larger (3+) family	48.5	46.9	46.0	45.9	51.7	49.7	41.9	43.4
Third or later birth order	22.6	19.4	20.3	19.0	21.8	21.1	17.4	18.4
Got up after 8.00 am	26.6	27.1	32.4	31.4	29.8	36.6	38.1	36.3
In bed after midnight	12.6	9.5	9.3	7.4	7.8	7.4	5.6	4.8
Had breakfast	85.4	88.7	89.5	92.7	75.2	80.5	82.5	83.7
Current smoker	18.8	15.7	15.9	10.8	18.2	21.8	14.2	16.8
High (13+) sporting index	13.2	11.7	12.5	13.4	8.3	6.4	8.7	9.7
Confident with opposite sex	53.6	56.0	51.0	42.9	58.3	58.3	52.9	41.3
Current boy-/girlfriend	26.6	25.7	24.8	26.3	36.4	33.8	31.2	33.8

The highest percentage in each group is underlined.

Towards recommendations

Neighbourhood

We have studied the effect of neighbourhood before (Shelley & Balding 1989) finding interesting patterns of difference between urban, suburban and rural pupils near a single city, which we have interpreted with respect to the social class of the pupils' families: lower-class families tend to live in the city centre and the rural villages, whereas middle-class families avoid the city centre, commuting from the suburbs or beyond. In this study we have a sample that includes large cities as well as districts that are largely rural.

Doubtless there are confounding regional effects, which could be investigated further, and we speculate that health promotion programmes could be differentiated to suit different neighbourhoods.

Self-esteem, locus of control, and lifestyle

Both self-esteem and locus of control are constructs of perceptions that people have about themselves; both were assessed by means of responses to statements offered in a set of related questions.

Self-esteem is a personal, subjective evaluation of an individual's worth, derived from the reflected appraisal of others, and has a 'positive-negative' dimension. The individual with high self-esteem shows confidence to overcome adversity and achieve success, but where the appraisal is negative the level of recorded self-esteem is likely to be low.

Perceived control (*health locus of control*) is a domain-specific perception about belief in personal control — that is, the degree to which individuals perceive that events which happen to them are causally related to their own behaviour. Where perception of a causal relationship is strong, the individual is described as high in *internal* control. Where events are perceived as being determined by outside forces over which the individual has little or no control, *external* control is said to be high.

We have published elsewhere the results of investigations into the links between these two personality variables and dental health behaviour (Regis et al 1994). These associations show that high self-esteem, and to a lesser extent internal perceived control, are associated with positive dental hygiene practices. This may be causal — people who value themselves more look after themselves better — but the correlations seen may be due to each being associated with a third factor, such as social class or good parental style (Foxcroft & Lowe 1992). We have pulled out of the text above some representative comparison variables and created a summary table of self-esteem levels for these lifestyle and other variables (Table 47).

There is more detail here than can be summarised easily, but we might suggest that many of the correlates of good dental hygiene behaviour seen on the summary tables above are also correlates of high self-esteem, with low self-esteem being associated with a generally less health-promoting pattern of behaviours. This is strong support for the view that toothbrushing behaviour patterns are bound up with the development of the complex of other health and social practices, and that this happens in a systematic way.

A similar point may be made with respect to health locus of control, although

TABLE 48. Percentages of schoolchildren aged 14–15, showing reported demographic, behavioural and dental care attributes by grouped health locus of control score.

	MALES				FEMALES			
	Health locus of control score				Health locus of control score			
	External		*Internal*		*External*		*Internal*	
Grouped health l.o.c. score	-12 to -4	-3 to 0	1 to 3	4 to 12	-12 to -4	-3 to 0	1 to 3	4 to 12
Brush teeth twice or more daily	62.5	71.3	73.5	74.1	87.1	84.6	86.5	85.5
Visited dentist in last 6 months	73.6	80.9	84.1	83.0	83.9	83.6	86.0	86.2
Fillings on last visit	27.8	24.3	20.3	19.5	19.4	24.7	19.1	21.6
Broadsheet newspaper	22.2	22.3	24.0	26.8	30.6	23.6	25.4	26.5
Southerner	56.9	63.2	70.1	67.8	69.4	63.6	66.1	66.7
City dweller	23.6	21.1	19.5	24.4	29.0	28.0	26.7	23.7
Both parents live at home	63.9	73.7	76.4	74.3	72.6	75.5	74.1	73.2
Larger (3+) family	48.6	46.4	47.7	44.9	45.2	46.7	44.7	43.4
Third or later birth order	20.8	21.4	21.3	18.0	12.9	18.6	18.7	18.6
Got up after 8.00 am	23.6	31.8	31.4	32.4	35.5	37.9	37.4	35.6
In bed after midnight	25.0	12.4	8.4	9.4	4.8	6.9	6.4	6.1
Had breakfast	80.6	88.1	90.3	90.9	72.6	77.7	81.6	81.6
Current smoker	22.2	18.7	13.6	11.3	19.4	19.0	17.2	17.1
High (13+) sporting index	6.9	10.8	13.1	16.8	8.1	9.2	8.0	10.2
Confident with opposite sex	48.6	45.6	53.4	47.7	48.4	54.3	52.6	47.9
Current boy-/girl-friend	34.7	27.4	23.4	24.4	30.6	34.8	33.2	33.1

The highest percentage in each group is underlined.

perceived health locus of control is a less good predictor of toothbrushing, and seems less reliably associated with the pattern of other lifestyle variables than is self-esteem. However, in general, more positive behaviours are associated with more internal control (Table 48).

Brushing frequency

Those that brush twice a day almost invariably do so in the morning (before or after breakfast) and before bed, which seems appropriate.

The once-only brushers — whose toothbrushing we have characterised as inadequate — we also know brush largely after breakfast, and do so for socially instrumental reasons. It would not seem hard to build on this existing pattern of behaviour, perhaps by emphasising the positive benefits of more frequent brushing, to promote an extra brushing before bed.

Toothbrushing patterns are part of people's lifestyle, and are influenced by other health practices and by social behaviour.

> **Recommendation:** Emphasise the importance of brushing the teeth twice a day, one of these times being *before going to bed.*

Smokers

The hesitations that some smokers have about their smoking habits may perhaps be exploited from a dental health point of view, discouraging the habit for dental health reasons. Smoking advice needs to be tailored to their lifestyle.

> **Recommendation:** The bad effect of tobacco on teeth could be exploited in a 'smoking education' programme.

Giving dental advice

This knowledge may appear to be of little practical use to dentists looking at patients with inadequate plaque control. By analogy, a specific infection may be associated with all sorts of environmental and social factors, but the appropriate treatment in every case may be the same anti-microbial drug. Similarly, while brushing behaviour may have complex origins, direct advice about brushing technique and schedule from clinicians may be the best practical approach to the patient.

Nonetheless, if we are interested in prevention — and this applies equally to the analogy with infectious disease — then we need to attend to this broad pattern of background factors. And it may also be the case that clinical advice might be usefully adapted to the rest of the patient's attitudes or other lifestyle factors: for example, couching advice in terms congruent with their main reasons for brushing, or with their perceptions of control. This needs to be done with sensitivity — that is, the actual pattern of beliefs held by the patient should be attended to, and patients should be encouraged to clarify their own ideas, rather than the clinician assuming that the patient holds a particular stereotyped pattern of beliefs (cf. Pill & Stott 1987).

We have recorded in these pages significant variation of recorded dental treatment and advice with different social factors. It may be that clinicians respond very differently to young people of different ages and social classes.

> **Recommendation:** Dental-care students are not, in general, receiving training in effective preventative dentistry. Courses need to recognise that this is a vitally important part of the dental service.

TABLE 49. Percentages of schoolchildren aged 14–15, surveyed in 1993, showing lifestyle factors and toothbrushing frequency, for comparison with the 1990 data presented elsewhere in this monograph.

Lifestyle factors	MALES Brushing frequency		FEMALES Brushing frequency		*Mean*
	Once or less	*Twice or more*	*Once or less*	*Twice or more*	
Visited dentist in last 6 months	56.2	39.5	48.2	38.8	41.4
Fillings on last visit	22.7	17.5	22.7	16.9	18.0
Broadsheet newspaper	18.8	29.9	21.5	30.9	28.8
Southerner	44.8	52.5	49.4	50.8	50.8
City dweller	24.8	25.3	28.6	27.6	26.4
Both parents live at home	7.5	7.3	9.1	9.4	8.3
Larger (3+) family	50.6	47.8	50.1	48.8	48.7
Third or later birth order	22.1	19.7	25.1	20.9	20.7
Only child	8.7	7.6	9.6	7.1	7.6
Nothing for breakfast	13.9	8.7	19.7	18.0	13.8
Current smoker	21.1	19.7	28.8	27.8	23.8
High (13+) sporting index	7.1	11.9	8.2	14.0	12.1
Esteem score 15–18 (high)	32.2	39.6	20.8	27.4	32.7
Internal hloc	61.1	67.2	58.5	63.9	64.8
Confident with opposite sex	39.0	45.8	52.0	48.8	46.7
Current boy-/girl-friend	63.6	62.9	56.2	54.9	59.2

Further work

What has emerged from this study is that there are some systematic associations which we have speculated may be linked to general differences in personality and culture.

This immediately suggests that some of the effects might be further investigated through, for example, quantitative study using selected personality scales, (e.g. extroversion, optimism) when we might find that, for example, the socially instrumental reasons are associated with a more extrovert personality. A qualitative approach to further study might involve interviews with children discussing their dental hygiene, to examine the cultural placing of these and other hygiene behaviours against possible mentions of the long-term control of health and life.

From our own point of view, there are a number of questions which may be pursued without gathering new data. For example, this report has looked in some depth at just one age band in one calendar year. The Unit's databanks cover young people between the ages of 7 and 19, and nationwide data for the secondary age groups exists for each calendar year since 1984. To confirm (or otherwise) these patterns of association in other year groups and at other times would be of interest and value.

We have had the opportunity of comparing some of these findings with the most recent data aggregation available, from our 1993 surveys. Broadly, they are confirmed by the latest figures. For example, the contrasting profiles of the once-or-less and at-least-once-a-day brushers, presented in Table 49, may be compared with the summary in Table 44.

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Appendix

The Health Related Behaviour Questionnaire, Version 12

PRACTICE PAGE

In this questionnaire there are different types of questions. These are the commonest

TYPE 1. These ask you to *write information in your own words*.

> About what time did you wake up this morning?
> *(Please write the time)*

TYPE 2. These ask you to indicate your answer by *drawing a circle around one number only*.

> How often have you ridden a bicycle during the past 2 weeks?
>
> | | |
> |---|---|
> | Not at all | 1 |
> | Once or twice | 2 |
> | Most days | 3 |
> | Every day | 4 |

TYPE 3. For these questions you are asked to answer by *circling one number on each line*.

> When did you clean your teeth yesterday?
>
> | | Yes | No |
> |---|---|---|
> | Before breakfast | 1 | 0 |
> | Just after breakfast | 1 | 0 |
> | During the day | 1 | 0 |
> | Before going to bed | 1 | 0 |

TYPE 4. These ask you to *circle the answer itself*.

> Do you think that your parents usually like to hear about your ideas? Yes No Don't know

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Please do NOT write in the boxes

HEALTH RELATED BEHAVIOUR

The purpose of this Questionnaire is to help your teachers plan some interesting and important new topics in school lessons. To do this, they need some information about yourself.

These questionnaires are confidential and will not be read by anyone connected with your school. All the analysis is carried out at Exeter University.

Therefore ...

(1) Please answer all questions honestly
(2) Do NOT write your name on any page

S

1. **Today is:** Tues. Wed. Thurs. Fri. *(Please circle)*
2. **Your sex is:** (male/female) ..... K
3. **Which year group are you in?** *(Please circle)*
   1 2 3 4 5 6 7 Y
4. **English set** ..... **Maths set** .....
5. **Your age is** ..... years ..... months
6. **Which parents live at home with you?** *(Please circle)*
   Mother Step-mother Father Step-father Foster parents
   Other *(please state)* .....
7. **You have** ..... **brothers and** ..... **sisters** S
   (include step-brothers and step-sisters if living at home)
8. **How many brothers and sisters are older than you?** ..... FP

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9. Which ethnic group would you describe yourself as?

Please do NOT write in the boxes

African	1	
Asian	2	
Caribbean	3	
Chinese	4	Circle ONE number only
European	5	
UK	6	
Other *(please state)*	7	

10. Whereabouts do you live?

Outside a town or village	1	
In a village	2	Circle ONE number only
In the suburbs of a town or city	3	
Near the centre of a town or city	4	

11. Please write your postcode if you can remember it

12. How often have you ridden a bicycle during the past 2 weeks?

Not at all	1	
Once or twice	2	Circle ONE number only
Most days	3	
Every day	4	

13. Motorbikes and mopeds: which sentence describes you best?

I do not intend learning to ride a motorbike or moped	1	
I intend learning to ride a mortorbike or moped	2	Circle ONE number only
I am learning to ride a motorbike or moped	3	
I have passed a test for a motorbike or moped	4	

14. Cars: which sentence describes you best?

I do not intend learning to drive a car	1	
I intend to drive a car	2	Circle ONE number only
I am learning to drive a car	3	
I have passed my driving test	4	

15. Have you ever tried to drive a car, even for a VERY short distance?

Yes	1	Circle ONE number only
No	0	

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16. How much time did you spend on these activities after school yesterday?

Please do NOT write in the boxes

	None	Up to 1 hr	Up to 2 hrs	Up to 3 hrs	Up to 4 hrs	Up to 5 hrs	Over 5 hrs
Watching TV programmes (live or recorded)	0	1	2	3	4	5	6
Watching videos (bought or borrowed)	0	1	2	3	4	5	6
Playing computer games or using the computer	0	1	2	3	4	5	6
Doing homework	0	1	2	3	4	5	6
Reading a book for pleasure	0	1	2	3	4	5	6

Please circle an answer on each line

17. Do you do a regular paid job during term time?

Yes	1	Circle ONE number only
No	0	

If you circled 0 please go to Question 21b

18. If you do a regular paid job during term time, which answer most nearly describes it?

Babysitting	1	
Working in a shop	2	
Manual work	3	
Paper round	4	Circle ONE number only
In a hotel, bar or cafe	5	
Farm work or gardening	6	
Paid housework	7	
Other *(please state)*	8	

19. When do you do this regular paid job?

Evenings	1	
Mornings	2	
Weekends	3	
Mornings & evenings	4	Circle ONE number only
Evenings & weekends	5	
Mornings & weekends	6	
All times	7	

20. How many hours did you spend on your regular paid job last week?

hours

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Please do NOT write in the boxes

21 **How much money did you receive last week as:**

a. Your regular paid job?
(if paid monthly, please calculate the weekly amount) £ ..... p

b. Pocket money or allowance?
(if paid monthly, please calculate the weekly amount) £ ..... p

22 **How much of your own money did you spend last week?** £ ..... p

23 **Do you keep money in any of the following schemes?**

	Yes	No
Bank	1	0
Building society	1	0
Post Office	1	0
Shares	1	0
Other *(Please state)*	1	0

Please circle an answer on each line

24 **Have you spent your own money on any of the following in the last 4 weeks?**
(Please circle an answer on each line)

	Yes	No
Sweets, chocolate, ice cream etc.	1	0
Comics, magazines	1	0
Books	1	0
Cigarettes	1	0
Soft drinks	1	0
Alcoholic drinks	1	0
Going to discos etc.	1	0
Clothes and footwear	1	0
Cosmetics/toiletries	1	0
Records, tapes or CD	1	0
School equipment	1	0
Cinema	1	0
Video hire	1	0
Pets	1	0
Slot machines — to win money	1	0
Slot machines — playing games only	1	0
Sports equipment	1	0
Computer equipment or games	1	0
Presents for other people	1	0
Jewellery	1	0
Leisure centre/sports centre	1	0
Other *(Please state)*	1	0

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25 **DURING THE PAST YEAR, which of the following activities did you take part in <u>except as part of normal lessons</u>?** *(Please circle an answer on each line)*

	More than once a week	Once a week	Never or hardly ever
Rowing	3	2	1
Squash	3	2	1
Basketball	3	2	1
Rugby	3	2	1
Soccer	3	2	1
Hockey	3	2	1
Swimming	3	2	1
Cross-country	3	2	1
Competitive cycling	3	2	1
Roller/ice skating	3	2	1
Netball	3	2	1
Jogging	3	2	1
Judo, Karate etc.	3	2	1
Gymnastics	3	2	1
Fitness exercises/aerobics	3	2	1
Tennis	3	2	1
Badminton	3	2	1
Track/field events	3	2	1
Table tennis	3	2	1
Weight training	3	2	1
Dancing	3	2	1
Canoeing	3	2	1
Sailing	3	2	1
Volleyball	3	2	1
Baseball	3	2	1
Cricket	3	2	1
Rounders	3	2	1
Horse riding	3	2	1
Scrambling	3	2	1
Hiking/orienteering	3	2	1
Fishing	3	2	1
Darts	3	2	1
Pool	3	2	1
Billiards	3	2	1
Snooker	3	2	1
Other *(please state)*			
.....	3	2	1
.....	3	2	1
.....	3	2	1

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26. Please read the following questions and circle one answer for each of them.

a.	Do you think that your parents usually like to hear about your ideas?	Yes	No	Don't know
b.	When you have to say something in front of teachers, do you usually feel uneasy?	Yes	No	Don't know
c.	Are there lots of things about yourself you would like to change?	Yes	No	Don't know
d.	Do other pupils in the school often fall out with you?	Yes	No	Don't know
e.	Do you often feel lonely at school?	Yes	No	Don't know
f.	Do you think that other pupils in the school often say nasty things about you?	Yes	No	Don't know
g.	When you want to tell a teacher something, do you usually feel silly?	Yes	No	Don't know
h.	Do you often have to find new friends because your old friends are with somebody else?	Yes	No	Don't know
i.	Do you usually feel foolish when you talk to your parents?	Yes	No	Don't know
j.	Do other people often think that you tell lies?	Yes	No	Don't know

40

27. Do you wash your hands after visiting the lavatory?

Never or almost never	1
Sometimes	2
Whenever possible	3

Circle ONE number only

28. When did you clean your teeth yesterday?

	Yes	No
Before breakfast	1	0
Just after breakfast	1	0
During the day	1	0
Before going to bed	1	0

Please circle an answer on each line

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Please do NOT write in the boxes

29. How many times in the last 7 days have you had a bath or shower?

Not at all	0
Once	1
2 or 3 times	2
4 or 5 times	4
6 or 7 times	6

Circle ONE number only

30. During the last 7 days, on how many days have you used any of the following?

	On doctor's orders	Not on doctor's orders
Iron tablets	.....days	.....days
Painkillers (aspirin, paracetamol, etc.)	.....days	.....days
Lotions or creams	.....days	.....days
Laxatives	.....days	.....days
Medication for asthma	.....days	.....days
Medication for diabetes	.....days	.....days
Medication for hay fever or allergies	.....days	.....days
Other *(please write)*	.....days	.....days

60

31. When did you last visit the doctor?

Within the past 7 days	1
Within the past month	2
Within the past 3 months	3
Within the past 6 months	4
Within the past year	5
More than a year ago	6

Circle ONE number only

32. Did you feel at ease with the doctor on this last visit?

No — very uneasy	1
No — a little uneasy	2
Yes — at ease	3

Circle ONE number only

33. Have you been vaccinated against:

(a) Tuberculosis (BCG)

Yes	3
No	1
Don't know	2

Circle ONE number only

GIRLS ONLY

(b) Rubella (German Measles)

Yes	3
No	1
Don't know	2

Circle ONE number only

BOYS ONLY *Please circle this number* 9

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34. When did you last visit the dentist in his or her surgery?

Within the past 7 days	1
Within the past month	2
Within the past 3 months	3
Within the past 6 months	4
Within the past year	5
More than a year ago	6

Circle ONE number only

35. What treatment or advice did the dentist give you on this last visit?

	Yes	No
Fillings	1	0
Extraction (having teeth out)	1	0
Scaling and polishing	1	0
Brace fitted or examined	1	0
Routine check-up	1	0
Advice on brushing	1	0
Advice on flossing	1	0
Other treatment	1	0

Please circle an answer on each line

36. What is your main reason for cleaning your teeth?

You like your teeth to look nice	1
To avoid wearing false teeth	2
You like your breath to smell clean	3
To avoid toothache and dental treatment	4
You like your teeth and mouth to feel clean	5

Circle ONE number only

37. What sort of lunch did you have yesterday?

In school — cafeteria	1
In school — set lunch	2
In school — your own packed lunch	3
Outside school — e.g. fish & chips, burger from shop	4
Outside school — your own packed lunch from home	5
At home	6
Did not have any lunch	7

Circle ONE number only

38. What sort of breakfast did you have this morning?

Nothing at all	0
Just something to drink	1
Tinned or fresh fruit (+ drink)	2
Cereal (+ drink)	3
Just an egg (+ drink)	4
Cooked breakfast with cereal, etc	5
Toast or bread	6
Toast and cereals	7
Something else	8

Circle ONE number only

39. Have you ever tried to lose weight?

Yes	1
No	0

Circle ONE number only

40. Have you ever tried to avoid putting on weight?

Yes	1
No	0

Circle ONE number only

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41. Please study each item in this list of foods, decide HOW OFTEN you eat them, and circle the appropriate number.

FOOD LIST	On most days	At least once a week	Less than once a week	Rarely or never
White bread	3	2	1	0
Wholemeal bread	3	2	1	0
Boiled potatoes	3	2	1	0
Jacket potatoes	3	2	1	0
Chips or roast potatoes	3	2	1	0
Pasta or rice	3	2	1	0
Skimmed or semi-skimmed milk	3	2	1	0
Ordinary milk	3	2	1	0
Yogurt	3	2	1	0
Butter	3	2	1	0
Low-fat margarine (e.g. Flora)	3	2	1	0
Cheese	3	2	1	0
Low-fat cheese (e.g. cottage cheese)	3	2	1	0
Sugar-coated cereals	3	2	1	0
Bran cereals	3	2	1	0
Muesli	3	2	1	0
Other cereals	3	2	1	0
Ordinary fizzy drinks	3	2	1	0
Low-calorie fizzy drinks	3	2	1	0
Fresh fruit	3	2	1	0
Tinned fruit	3	2	1	0
Baked beans	3	2	1	0
Vegetables	3	2	1	0
Salad	3	2	1	0
Puddings	3	2	1	0
Ice cream	3	2	1	0
Sugar added to foods or drinks	3	2	1	0
Red meat (e.g. lamb, beef, pork)	3	2	1	0
White meat (e.g. chicken, turkey)	3	2	1	0
Meat pasties, pies or sausage rolls	3	2	1	0
Burgers or sausages	3	2	1	0
Liver or kidney	3	2	1	0
Eggs	3	2	1	0
Fish or fish fingers	3	2	1	0
Biscuits	3	2	1	0
Crisps	3	2	1	0
Sweets, chocolates, chocolate bars	3	2	1	0
Cakes or tarts	3	2	1	0

Please circle an answer on each line

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42. Smoking — which of the following most nearly describes you?

I have never smoked a cigarette	0
I have only ever tried smoking once or twice	1
I used to smoke sometimes, but I don't now	2
I smoke and I would like to give it up	3
I do not want to give up smoking	4

Circle ONE number only

If you circled 0 please go to Question 45

43. Since this time yesterday, how many cigarettes have you smoked?

..... cigarettes

44. Since this time last week, how many cigarettes have you smoked?

..... cigarettes

45. Which adult do you get on best with?

Mother	0
Father	1
Mother and father	2
Brother and sister	3
Other relation	4
Teacher	5
Friend	6
Employer	7
No-one	8

Circle ONE number only

46. Have you a regular boyfriend or girlfriend?

Yes	1
No	0

Circle ONE number only

47. If you have, how long has this relationship lasted?

Weeks	1
Months	2
A year	3
More than a year	4

Circle ONE number only

48. When you meet people of your own age and sex, how do you feel?

Very uneasy	1
A little uneasy	2
At ease	3

Circle ONE number only

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Please do NOT write in the boxes

49. When you meet new people of your own age and opposite sex, how do you feel?

Very uneasy	1
A little uneasy	2
At ease	3

Circle ONE number only

60

50. For close friends, whom do you have?

More people of your own sex	1
About the same number of both sexes	2
More people of the opposite sex	3

Circle ONE number only

51. When did you last go to a disco or dance in school or outside school?

Within the last week	1
Within the last 2 weeks	2
Within the last month	3
Within the last 6 months	4
Not within the last 6 months	5
I have never been to either	6

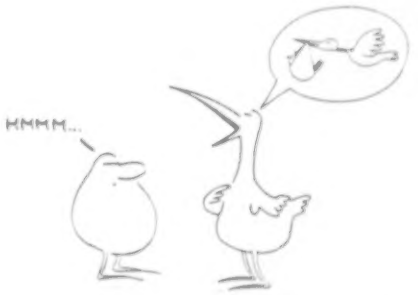
Circle ONE number only

52. Please indicate who or what is your main source of information about sex

Your parents	1
Your teachers	2
Your friends	3
Brothers, sisters, other close relations	4
Doctor, Family Planning Association etc.	5
Books, posters, magazines, television etc.	6
Other sources *(please state which)*	7

Circle ONE number only

53. Who or what do you think should be your main source of information about sex?



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Please do NOT write in the boxes

54 On how many days since this time last week have you had an alcoholic drink, apart from canned shandy?

(Please circle the number of days) 0 1 2 3 4 5 6 7

If you circled 0 please go to Question 57

55 Since this time last week, how much of the following have you drunk?

Assume that one small can equals half a pint

Shandy (canned)	pints	SC
Shandy (mixed)	pints	S
Beer (including lager)	pints	B
Cider	pints	C
Wine	glasses	W
Martini, Cinzano, vermouth, port, sherry	glasses	V
Spirits (gin, whisky, vodka, brandy, rum, Bacardi, Pernod, etc.)	measures	S
		BZ

56 Did you get this drink from any of the following sources?

Please circle an answer on each line

	Yes	No
Supermarket	1	0
Off-licence	1	0
The pub (or bar)	1	0
Your home	1	0
Friend's home	1	0
Relation's home	1	0
Disco or party	1	0
Somewhere else (please state)	1	0

.....

57 Do you ever drink alcohol at home?

Yes 1

No 0

If YES, do your parents know when you drink at home?

Always	Sometimes	Rarely	Never
4	3	2	1

58 Please say how many times you have visited a pub or bar since this time last week (even if you didn't drink anything)

.....times

59 When you last went to a pub or bar, how did you go?

Circle ONE number only

I have never been in a pub	0
Alone	1
With your parents	2
With a friend of the same sex	3
With a friend of the opposite sex	4
With a group of friends	5
With brothers or sisters	6

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Please do NOT write in the boxes

60 About what time did you wake up this morning?

(Please write the time) .....

61 About what time did you go to sleep last night?

(Please write the time) .....

62 Here is a list of drugs (apart from alcohol and tobacco), with their real names and some street names. Please think about each one and circle one number on each line.

Please circle an answer on each line

	Very dangerous	Safe if used properly	Don't know
A. Amphetamines (e.g. speed, stimulants, uppers)	2	1	0
B. Barbiturates (e.g. downers, barbies, sleepers)	2	1	0
C. Cannabis (leaf form, e.g. grass, hash, pot)	2	1	0
D. Cannabis (oil or resin, e.g. Leb black, moroccan)	2	1	0
E. Cocaine (e.g. coke, crack, snow)	2	1	0
F. Hallucinogens (natural, e.g. magic mushrooms)	2	1	0
G. Hallucinogens (synthetic, e.g. acid, angel dust, LSD)	2	1	0
H. Heroin (e.g. H, junk, skag, smack)	2	1	0
I. Solvents (e.g. glue, gas, cleansing fluid)	2	1	0
J. Tranquillisers (e.g. librium, valium)	2	1	0
K. Opiates (e.g. morphine, pethedine, diconal)	2	1	0

63 Have you ever been offered any of the drugs listed in Question 62?

If NO, please circle . . . . . No

If YES, please circle the appropriate letters from the list in Question 62:

A B C D E F G H I J K

64 Have you ever used any of the above drugs (without doctor's prescription)?

If NO, please circle . . . . . No

If YES, please circle the appropriate letters from the list in Question 62:

A B C D E F G H I J K

65 Do you know anyone who you think takes any of the above drugs?
Please circle:

Yes No Don't know

If YES, which ones do they take? Please circle the appropriate letters from the list in Question 62.

A B C D E F G H I J K

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Please do NOT write in the boxes

66 Have you ever received information about the use and effects of the following drugs from these sources?

	Parents	Teachers	Friends	Books, posters	TV or radio	No information
Alcohol	0	0	0	0	0	0
Tobacco	0	0	0	0	0	0
Amphetamines	0	0	0	0	0	0
Barbiturates	0	0	0	0	0	0
Cannabis (leaf)	0	0	0	0	0	0
Cannabis (oil or resin)	0	0	0	0	0	0
Cocaine	0	0	0	0	0	0
Hallucinogens (natural)	0	0	0	0	0	0
Hallucinogens (synthetic)	0	0	0	0	0	0
Heroin	0	0	0	0	0	0
Solvents	0	0	0	0	0	0
Tranquillisers	0	0	0	0	0	0
Opiates	0	0	0	0	0	0

Please circle an answer on each line

67 Do you think you should be given information about drugs at school?

Yes 1
No 0

Circle ONE number only

If YES, at what age should you FIRST be given information about the following drugs?

	Primary school	11-12	12-13	13-14	14-15	15-16
Alcohol	1	2	3	4	5	6
Tobacco	1	2	3	4	5	6
Drugs in Question 66	1	2	3	4	5	6

Please circle an answer on each line

68 Which of the following best describes you?

I have never tried cannabis 0
I have tried cannabis once or twice 1
I used to take cannabis but I don't now 2
I take cannabis occasionally 3
I take cannabis more than once a month but less than once a week 4
I take cannabis once a week or more 5

Circle ONE number only

69 Please draw a circle round the names of any of the following NATIONAL newspapers that are regularly in your home.

Express, Guardian, Mail, Mirror, Telegraph
Times, Star, Sun, Today, Independent
Scotsman, Daily Express (Scotland), Daily Record (Scotland)

Other (Please write) . . . . .

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70 If you had a problem with any of these with whom would you share them? (Please circle ONE number only in each line.)

	Mother	Father	Mother and father	Brother or sister	Other relation	Teacher	Friend	Employer	No-one
School	0	1	2	3	4	5	6	7	8
Money	0	1	2	3	4	5	6	7	8
Health	0	1	2	3	4	5	6	7	8
Career	0	1	2	3	4	5	6	7	8
Friends	0	1	2	3	4	5	6	7	8
Family	0	1	2	3	4	5	6	7	8

The following six questions are about AIDS.

A virus causes the disease called AIDS. People can catch the virus and then develop the disease. In these following questions, when we mention catching AIDS we really mean catching the virus which causes AIDS.

71 Can AIDS be caught by ...

		Yes	No	Not sure
Drug taking	– by mouth	2	0	1
	– by injection	2	0	1
	– by sharing needles	2	0	1
Blood transfusions		2	0	1
Touching skin/shaking hands		2	0	1
From lavatory seats		2	0	1
In First Aid	– mouth to mouth resuscitation	2	0	1
	– contact with blood	2	0	1
Kissing	– light kissing (lips only)	2	0	1
	– deep kissing (inside mouth)	2	0	1
Sexual intercourse	– male with female	2	0	1
	– male with male (gays)	2	0	1
	– female with female (lesbians)	2	0	1

Please circle an answer on each line

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72. Have you discussed AIDS with

Please do NOT write in the boxes

	Never	Once or twice	A few times	A lot
Parents	1	2	3	4
Teachers	1	2	3	4
Friends	1	2	3	4
Brothers, sisters	1	2	3	4
Other close relations	1	2	3	4
Doctor, Family Planning	1	2	3	4

Please circle an answer on each line

73. Have you learned any facts about AIDS from

	No	Some	A lot
TV adverts	1	2	3
TV programmes	1	2	3
Newspapers	1	2	3
Posters	1	2	3
Leaflets	1	2	3
School videos	1	2	3
School lessons	1	2	3

Please circle an answer on each line

74. How much do you fear getting AIDS?

Not at all	0
A little	1
Quite a lot	2
A lot	3
I don't think about it	4

Circle ONE number only

75. What do you think are the best methods of preventing infection with the AIDS virus?

(Please write your answers)

1 .....

2 .....

3 .....

76. Do you think that you will take precautions against getting AIDS?

No	0
Not sure	1
Yes	2

Circle ONE number only

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77. Study the following statements and questions and *circle one answer for each.*

Please do NOT write in the boxes

a. "I look forward to the future with hope and enthusiasm."

strongly disagree | disagree | not sure | agree | strongly agree

b. "I don't expect to get what I really want."

strongly disagree | disagree | not sure | agree | strongly agree

c. "In the future I expect to succeed in what I care about."

strongly disagree | disagree | not sure | agree | strongly agree

d. "I don't think I'll ever be happy with my life."

strongly disagree | disagree | not sure | agree | strongly agree

e. Over the last couple of years, how OFTEN have you felt generally fed up?

never | almost never | sometimes | fairly often | very often

f. Over the last couple of years, how OFTEN have you felt useless?

never | almost never | sometimes | fairly often | very often

g. THINK OF A PERSON who feels a failure in life. Is this person ...

not at all like you | very little like you | a bit like you | quite like you | very much like you

h. In general, how satisfied do you feel with your life at the moment?

not at all | not much | not sure | quite a lot | very much

i. Over the last couple of years how OFTEN have you felt worried about doing your best?

never | almost never | sometimes | fairly often | very often

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Please do NOT write in the boxes

18 **Study the following statements and questions and** *circle one answer for each.*

a **Over the last couple of years how OFTEN have you felt satisfied with the standards you achieve in your life?**

never | almost never | sometimes | fairly often | very often

b **In general, how satisfied do you feel with your school performance at the moment?**

not at all | not much | not sure | quite a lot | very much

c **THINK OF A PERSON who tries to be perfect in their work. Is this person**

not at all like you | very little like you | a bit like you | quite like you | very much like you

d **"I am directly responsible for my health."**

strongly disagree | disagree | not sure | agree | strongly agree

e **"Whatever goes wrong with my health is my own fault."**

strongly disagree | disagree | not sure | agree | strongly agree

f **"When I stay healthy, that just means I've been lucky."**

strongly disagree | disagree | not sure | agree | strongly agree

g **"My health depends on how well I take care of myself."**

strongly disagree | disagree | not sure | agree | strongly agree

h **"Even when I look after myself, it's easy to fall ill."**

strongly disagree | disagree | not sure | agree | strongly agree

i **"When I fall ill, it's just a matter of chance."**

strongly disagree | disagree | not sure | agree | strongly agree

THE END!

Thank you for completing this questionnaire.

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What is your main reason for cleaning your teeth?

What sort of lunch did you have yesterday?

What sort of breakfast did you have this morning?

JUST AN EGG

Have you ever tried to lose weight?

Have you ever tried to avoid putting on weight?

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